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WHOLESALE FOOD DISTRIBUTION FACILITIES

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Transportation and Facilities Research Division
Agricultural Marketing Service
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Marketing Research Report No. 404

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SUMMARY

The study on which this report is based was made during the fall and winter of 1958 and the spring of 1959, at the invitation of the Agricultural Council of the Knoxville Chamber of Commerce. The University of Tennessee, the Agricultural Experiment Station, and the Agricultural Extension Service (Agricultural Economics and Rural Sociology Department) assisted by collecting data and by cooperating in other ways.

Knoxville received 23,534 carlot equivalents of food commodities in 1958. The foods include fresh fruits and vegetables, poultry and eggs, meat and meat products, dry groceries, frozen foods, and dairy products handled by independent wholesalers and food chains in Knoxville.

In 1957 the Knoxville metropolitan area had an estimated population of 358,000. The area served by Knoxville wholesalers had an estimated population of 1.6 million. At present the city has major rail and highway connections, but can anticipate additional advantages from being located at the intersection of several of the new interstate highway routes.

Of the 23,534 carlot equivalents handled through Knoxville, 3,056 came from local sources, 2,441 arrived by rail, and the remaining 18,037 carlots arrived by truck. Of this total volume, 51 percent was distributed within the Knoxville metropolitan area, 10 percent was distributed to wholesalers outside the area, and 39 percent to retailers outside the area.

As a result of the inadequacies of present facilities, substantial amounts of labor, above that which should be normally required, were involved in handling food commodities into, within, and out of the various stores. In addition, many wholesalers-- because of the lack of house tracks and adequate platforms for loading and unloading-- had high cartage and handling costs. The measurable costs to Knoxville food wholesalers for cartage, handling, interdealer movement, spoilage, breakage, deterioration, shrinkage, and rental or occupancy cost was over $2.5 million in 1958.

The plan for a modern wholesale food center which would provide for present and anticipated needs was developed for Knoxville. The following facilities are those needed by Knoxville food wholesalers. Only part of these facilities are needed immediately; the rest will be needed later. The complete food center would include 35 multiple-store units for fruit and vegetable carlot receivers and commodity specialists and for a restaurant, 20 small multiple units for trucker-jobbers and growers, 150 covered farmers' stalls, 100 open farmers' stalls, a container shed, public restrooms (under the restaurant), and 20 offices.

The poultry and egg wholesalers, including poultry dressers, would require 10 multiple-store units and a detached building. There would be 6 multiple-store units for meat dealers, 2 detached buildings for packer-branch houses, and 3 detached buildings for slaughterers. Six detached buildings would be

needed by dry grocery and frozen-food wholesalers, as well as 4 detached buildings for the food chain organizations. A public refrigerated warehouse would also be needed. An area of 22 acres was included for allied food industries.

Direct rail connections and double trackage would be provided for convenient access to railcars in unloading either at the store or directly into trucks. Parking space adjacent to the buildings and in special parking areas would be provided for market and nonmarket vehicles. Major market streets should be at least 160 feet wide to prevent undue traffic congestion.

All of these facilities, including streets, space for future expansion, and space for allied industries would require 170 acres.

Ten possible sites for a food center were studied, nine of which were found to be suitable. These sites were selected, not to include all possible sites, but rather to illustrate problems which might be encountered in sites of specific characteristics and in specific locations.

The entire project, as outlined in the master plan, would cost about $15 million (1959 cost basis). A breakdown of these costs shows:

Fresh fruit and vegetables, $2 million
Poultry and eggs, $700,000
Meat and meat products, $2.9 million
Dry groceries and frozen food, $2 million
Food chain warehouses, $3.4 million
Public refrigerated warehouse, $3.8 million
Allied food industries, $300,000.

The construction of a modern wholesale food center would make possible an estimated annual reduction of $840,000 in the costs of operation, which would be effected by the recommended facilities. After an allowance for increased rentals required in a modern wholesale food center, an annual net savings of $430,000 would be possible.

Estimated savings would accrue principally from cost reductions due to efficiencies in the handling operation. Additional benefits would accrue to workers, dealers, buyers, and consumers. Producers in local and surrounding areas would benefit from having an organized market for their products. In addition, the local government would benefit from higher tax revenue; simplified enforcement of fire, health, and sanitary regulations; and improved traffic flow. Consumers would benefit by having improved quality merchandise.

WHOLESALE FOOD DISTRIBUTION FACILITIES FOR KNOXVILLE, TENN.

By Kenneth L. Utter and Earl G. Taylor, marketing specialists,
A. B. Lowstuter, architectural engineer, and Paul J. Hanlon,
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Agricultural Marketing Service

BACKGROUND OF STUDY

This study was initiated in the fall of 1958 at the request of the Knoxville Chamber of Commerce, Tennessee Agricultural Extension Service, Tennessee Agricultural Experiment Station, and interested officials of the local government. The original request was for assistance in planning improved facilities for a wholesale fresh fruit and vegetable market, particularly farmers' market facilities. However, after a preliminary investigation, other wholesale food handling facilities appeared to be such that the study was expanded to include poultry, eggs, meat and meat products, frozen foods, dry groceries, and food chain warehouse facilities.

Interest in improving wholesale facilities for handling fresh fruits and vegetables in Knoxville has been of concern for at least 2 decades. In 1940 a series of publications by the University of Tennessee Experiment Station reported a study on the entire fruit and vegetable marketing situation of that period (5). 1/ In the discussion of facilities in that study (Part IV, p.21), concern was expressed about the future of various aspects of the situation: "When storage and processing facilities are lacking, what may be profitably developed in connection with a farmers' fruit and vegetable market?"

Recently, growers have expressed concern about some of the present facilities being used for a farmers' market. Local wholesale dealers have seen new wholesale facilities opened in Louisville, Chattanooga, and Atlanta and have begun to feel the competitive effect of such improved facilities. This study was initiated to examine the feasibility of a wholesale food center in Knoxville.

This study of the facilities for handling the major food commodities at wholesale in Knoxville is part of a broad program of marketing research to aid in reducing costs and expanding markets for farm products. It had the following objectives:

1. To analyze the present wholesale food marketing situation in Knoxville and to ascertain the adequacy of present facilities in the light of present and future needs.

1/ Underscored figures in parentheses refer to Literature Cited, page 78.

2. To determine those facilities that would best suit present and future needs.

3. To estimate--should facility improvements be recommended--costs of facility improvements or construction, possible operating expenses, and self-liquidating potential.

4. To estimate probable cost reductions and benefits from any suggested improvements.

Data in this report were obtained by personal interviews and examination of records of the various wholesale food handling firms with the cooperation of the Tennessee Agricultural Experiment Station. Information was obtained from buyers patronizing various firms and from truckers hauling to and from these firms. Additional information was obtained from patrons and growers on the farmers' markets and Market Square retail market.

Other data and statistics were supplied or made available by officials of the city, State, and Federal Governments, railroads serving Knoxville, and members of the Knoxville Chamber of Commerce.

IMPORTANCE OF KNOXVILLE AS A FOOD MARKETING CENTER

The Knoxville metropolitan area, as defined by the U. S. Bureau of the Census in 1950, consisted of Knox, Anderson, and Blount Counties. This area was the most populous area in east Tennessee and was second in population only to the Memphis metropolitan area in the State.

Population of the Knoxville metropolitan area in 1950 was 337,100. 2/ The Bureau of Business and Economic Research, University of Tennessee, estimated that the 1957 population of the metropolitan area was 358,000 (3) and projected the population in 1970 to be 461,500. The 1970 estimate would be 129 percent of the 1957 estimate. These population estimates were made by using the natural increase-net migration method and then adjusting to Census Bureau area and State estimates. This method has traditionally yielded conservative, reasonably accurate estimates.

In addition to the Knoxville metropolitan area, wholesalers in Knoxville consistently distributed foodstuffs into 23 east Tennessee counties, 3/ 9 Kentucky counties, 5 North Carolina counties, and 4 Virginia counties. This area had a 1950 population of 1,288,100,(6) making the total population of the distribution area 1,625,200.

Using the University of Tennessee estimate of the 1957 population for the Tennessee counties, and estimating populations for counties in the other States, the population of the total distribution area in 1957 was 1,706,300, a population increase of about 5 percent over 1950.

2/ Adapted by independently rounding data in (6) Vol.II, Chapter A.
3/ See chapter on distribution of supplies.

Similar computation would indicate that the population for the entire area in 1970 would be 2,062,500, or a population increase of about 21 percent over the 1957 estimate.

The Louisville & Nashville Railroad and the Southern Railway serve Knoxville, each maintaining its own team tracks and industrial sidings. Interchange of cars between lines is carried out in the area close to the Forest Avenue fruit and vegetable market; however, this market area is not served directly with spurs of either railroad. Through Knoxville the Southern Railway is primarily an east-west line, except for its Clinton Division, while the Louisville & Nashville Railroad is primarily a north-south line. The Smoky Mountain Railroad also operates out of Knoxville. The location of railroads serving Knoxville is shown in figure 1.

A network of major Federal and State highways connects the city's food wholesalers with sources of supply and with their customers. In the proposed interstate highway building program, Knoxville will be at the intersection of routes connecting Bristol, Chattanooga, Asheville, and Cincinnati. Within the city itself, a system of expressways is being planned and construction is underway in some sections. Highways serving Knoxville may also be seen in figure 1.

PRESENT MARKETING OPERATIONS

The retail food business of almost any metropolitan area comprises a large and important part of the commercial activities of that area. In the Knoxville area (Knox, Anderson, and Blount Counties) there were 729 retail food stores in 1954 with collective sales in excess of $83 million. These food store sales represented almost 25 percent of the total retail sales of $342 million (7, table 2).

The wholesale food business in Knoxville was carried on in 1958 by 61 wholesale dealers, including 4 food chain organizations. Since many of these dealers handled more than one commodity, it was difficult to stratify them on a commodity basis. However, because of the lack of more suitable criteria, the wholesale dealers were classified by commodity insofar as possible. Thus, when a dealer handled more than one commodity, he was classified according to the major commodity handled. Except for food chain organizations, volumes of secondary commodities were relatively small. Chain organizations were considered separately because they handled all of the commodities included in the study. Location of each wholesale food dealer, by type of commodity handled, may be seen in figure 2. Grocery specialty wholesalers dealing primarily in products such as dry beans, candy, pickles, tea, and coffee were not included in the study.

The volume of food handled by the 61 wholesalers was estimated after each dealer was interviewed, the records of selected dealers analyzed, and the commodity volumes substantiated. Volumes handled by dealers who were classified in one commodity, but who also handled another commodity were apportioned to the various commodities. For example, if dealer "A" handled 200 carlots of meat and meat products and 10 carlots of eggs, dealer "A" was classified as a "meat and meat products" dealer, but the 10 carlots of eggs would be included in the "poultry and egg"volume.

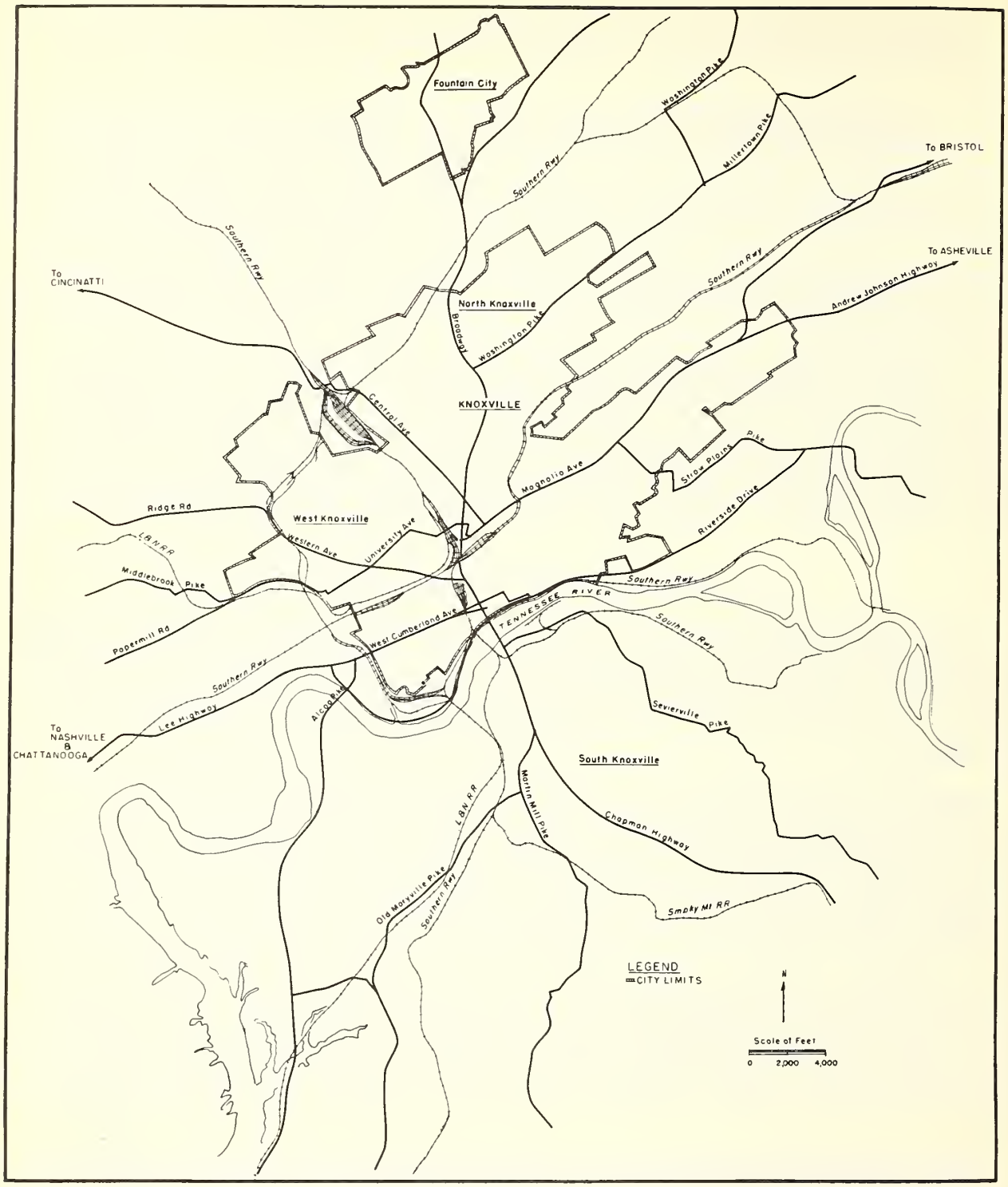

Figure 1.--Existing major highways and railroads in Knoxville.

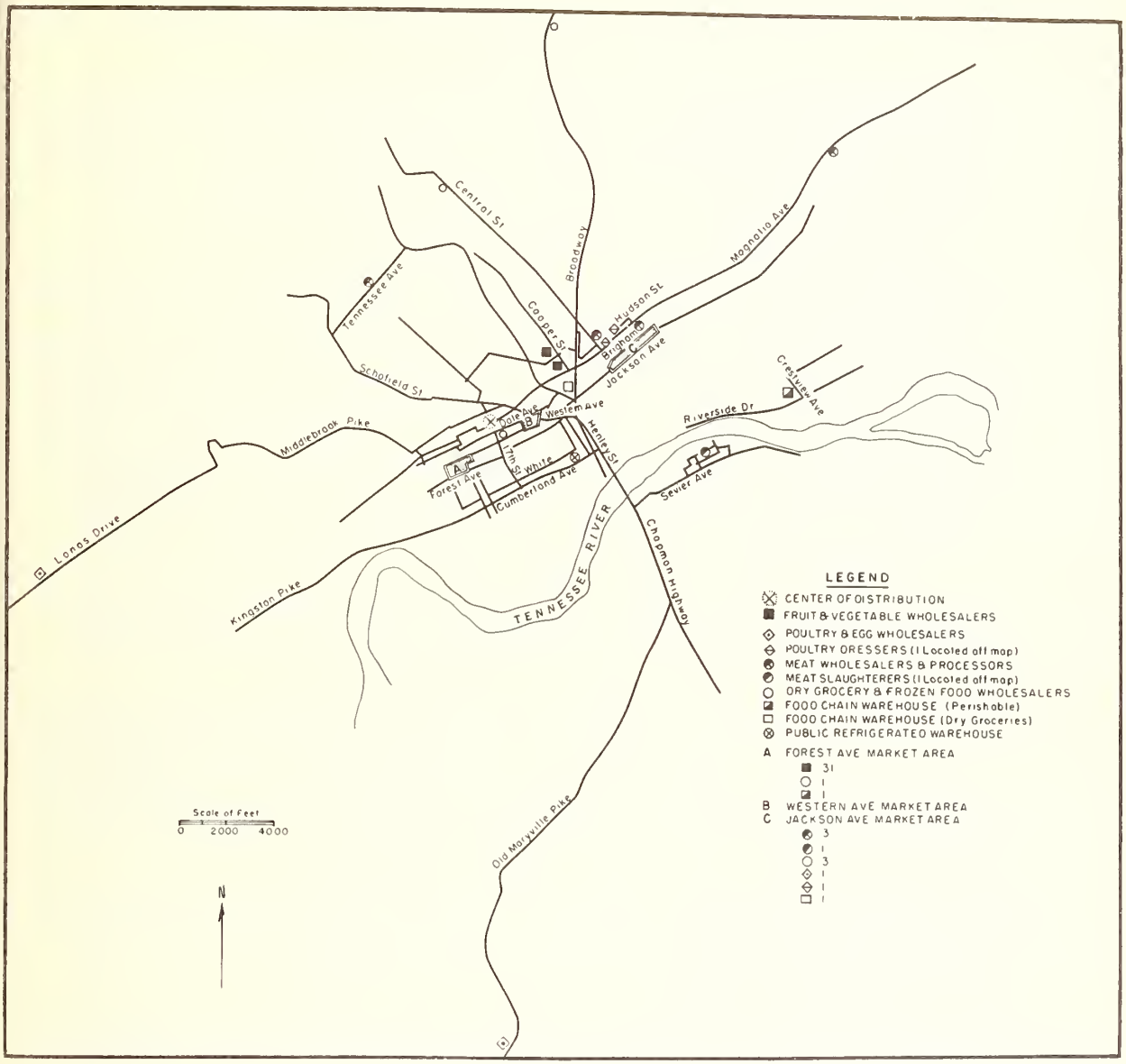

Figure 2.--Location of wholesale food dealers and marketing areas in Knoxville, Tenn.

The wholesale dealers classified by types and their volumes by methods of transportation are listed in table 1. In table 1, as well as in subsequent tables, carlot figures are computed on an equivalent carlot basis and do not indicate the actual arrival of such units.

Fresh Fruits and Vegetables

Fresh fruits and vegetables, in 1958, were handled by 33 wholesale dealers and the 4 food chain organizations. Of the wholesale dealers, 14 were carlot receivers, 11 were commodity specialists, and 8 were trucker-jobbers. Wholesale fresh fruits and vegetables were also marketed through local farmers' market outlets.

Carlot receivers usually had large-scale operations, generally received in carlot equivalents, and normally carried a full line of fruits and vegetables.

Commodity specialists primarily specialized in either ripening and repacking tomatoes or storing and ripening bananas. A few carlot receivers performed similar functions.

Trucker-jobbers typically handled commodities that they or their agents purchased in producing areas and brought to the Knoxville market for resale. Such dealers usually bought and sold in relatively small quantities and dealt primarily in seasonal commodities.

Farmers' market sales were made by local producers and truckers. The number of such dealers and producers varied seasonally from 70 to 250 per day.

The 33 independent fruit and vegetable dealers handled 5,941 carlots of which 5,170 carlots, or 87 percent, arrived by truck. There were also approximately 806 carlots of wholesale fresh fruits and vegetables handled through the local farmers' markets. The total volume of direct receipts of fresh fruits and vegetables handled by wholesale dealers and farmers' market operators was 6,747 carlots in 1958.

In addition to this total, 2,091 carlots were handled by food chain organizations. Approximately 272 carlots were handled between dealers within the market or between the market and food chain organizations.

A total of 8,838 carlots of fresh fruit and vegetable direct receipts was distributed through Knoxville. With the addition of the 272 carlots "second handled," a total of 9,110 carlots was handled.

Poultry and Eggs

Poultry and eggs, in 1958, were handled by 7 wholesale dealers and the 4 food chain organizations. Of these wholesale dealers, 3 handled eggs and dressed poultry while 4 maintained poultry-dressing facilities in addition to handling eggs and poultry.

A total of 1,379 carlots was handled, of which 854 carlots arrived by over-the-road trucks and 525 carlots were from local production areas. In addition

Table 1.--Number of wholesale dealers and estimated volume of direct receipts, Knoxville, 1958

Type of wholesaler	Dealers	Volume of direct receipts: Rail	Truck receipts from local production areas	Other truck receipts	Total
	Number	Carlots	Carlots	Carlots	Carlots
Fresh fruits and vegetables:					
Carlot receivers	14	523	30	3,449	4,002
Commodity specialists	11	124	18	1,198	1,340
Trucker-jobbers	8	6	70	523	599
Farmers' market	1/	0	806	0	806
Total 2/	33	653	924	5,170	6,747
Poultry and eggs:					
Wholesalers	3	0	180	209	389
Processors and wholesalers	4	0	345	645	990
Total 3/	7	0	525	854	1,379
Meat and meat products:					
Wholesalers 4/	7	199	0	1,134	1,333
Slaughterers	3	0	1,401	1,551	2,952
Total	10	199	1,401	2,685	4,285
Dry groceries and frozen foods 5/	7	763	0	1,849	2,612
Food chain organizations 6/	4	826	206	7,479	8,511
Grand total	61	2,441	3,056	18,037	23,534

1/ Number of dealers does not include between 70 and 250 growers on farmers' market.
2/ Excludes 272 carlots intermarket (second handling) receipts.
3/ Excludes 18 carlots intermarket (second handling)receipts.
4/ Includes packer branch houses but excludes 304 carlots intermarket (second handling) as meat from livestock receipts.
5/ Excludes 39 carlots intermarket (second handling) receipts.
6/ Includes volume of 2 food chain organizations not having local warehouses, but excludes 621 carlots intermarket(second handling) receipts.

to these carlots handled by poultry and egg dealers, food chain organizations handled about 427 carlots. Some food chains received "direct-to-store" delivery of eggs. This volume was included in the dealer volume rather than the chain organization volume. Including volumes of wholesale dealers and food chain organizations, a total of 1,806 carlots of poultry and eggs was distributed through the Knoxville market. In addition, 18 carlots were "second handled," making a total of 1,824 carlots handled.

Meat and Meat Products

Meat and meat products, in 1958, were handled by 10 wholesale dealers and the 4 food chain organizations. Of these 10 wholesale dealers, 5 were wholesalers and sausage processors, 2 were packer branch houses, and 3 were slaughterers. Two of the slaughterers were under Federal inspection and were, thereby, eligible to engage in interstate commerce.

The 10 wholesale dealers handled 4,285 carlots of meat and meat products. Of this amount, 199 carlots arrived by rail, and the balance, 4,086 carlots--including 1,401 dressed-equivalent carlots of local livestock to slaughterers--arrived by truck.

Food chain organizations handled 2,180 carlots. There were 304 carlots of interdealer movement. A total of 6,465 carlots of direct receipts was received by the dealers and food chains. With the addition of the 304 carlots "second handled," a total of 6,769 carlots of meat and meat products was handled in Knoxville.

Dry Groceries and Frozen Foods

Dry groceries and frozen foods, in 1958, were handled by 7 wholesale dealers. Of these dealers, 3 handled dry groceries exclusively, 2 handled only frozen food, and 2 handled a combination. One of the frozen-food dealers also processed a substantial volume of frozen food, such as meat and fruit pies. His volume was excluded from the study because it was distributed primarily to other areas of the country.

A total of 2,612 carlots of dry groceries and frozen foods was handled; 1,849 carlots, or 71 percent, arrived by truck. Food chain organizations handled 3,813 carlots, making a total of 6,425 carlots of direct receipts distributed from Knoxville. There were 39 carlots "second handled" making a total of 6,464 carlots handled.

Food Chain Organizations

Of the 4 food chain organizations, only 2 maintained warehouses in Knoxville. However, the 2 organizations without warehouses were included in the study because of their importance to the market. The food chain organizations handled a total of 8,511 carlots of the various commodities, or about 36 percent of the food handled in Knoxville. They acquired 621 carlots of various commodities from local sources. These organizations distributed 2,091 carlots of

fresh fruits and vegetables, 427 carlots of poultry and eggs, 2,180 carlots of meat and meat products, and 3,813 carlots of dry groceries and frozen food.

Public Refrigerated Warehouse

At the time of this study, a public refrigerated warehouse was located near the University of Tennessee Main Campus. This warehouse served wholesalers in Knoxville and stored in transit for wholesalers and growers throughout the Southeast.

Other Marketing Operations

Associated with the wholesale food handling business in Knoxville, but not actually an integrated part of this business, were several individuals such as food brokers and district agents. They occupied offices in various parts of the city. There were also wholesalers of condiments, canned goods, and other food items which were not examined in detail for this report. In addition, the wholesale food handling businesses sold to restaurants and other service establishments.

Method of Transportation and Size of Dealers

In 1958, the food wholesalers in Knoxville, including food chain organizations, received a total of 23,534 carlot equivalents of food. Of this volume, 21,093 carlots or 90 percent arrived by truck; 3,056 carlots or 13 percent of the total volume was from local production areas. The remaining 2,441 carlots or 10 percent arrived by rail. Of the rail receipts, approximately two-thirds (1,597 carlots) or 7 percent of the total volume, arrived at house tracks; the remaining 3 percent (844 carlots) of the total volume arrived at team tracks.

As may be seen in table 2, there was considerable variation in the relative percentage of total food handled by the different types of wholesalers. Fresh fruit and vegetable dealers handled 29 percent of the total volume; poultry and egg dealers handled 6 percent; meat and meat product dealers handled 18 percent; dry grocery and frozen food dealers handled 11 percent; and food chain organizations handled 36 percent. The proportion of each commodity group handled by different types of dealers also varied considerably.

PRESENT MARKETING AREAS AND WHOLESALE MARKETING FACILITIES

Facilities of the various types of wholesale dealers were examined and measured by the survey team. Facilities used by wholesalers of food items included in the study were located in several different market areas and sections of the city.

Table 2.--Direct receipts handled by food wholesalers, Knoxville, 1958

Type of wholesaler	Volume of direct receipts	Percentage of total volume
	Carlots	Percent
Fresh fruits and vegetables:		
Carlot receivers	4,002	17
Commodity specialists	1,340	6
Trucker-jobbers	599	3
Farmers' market	806	3
Total	6,747	29
Poultry and eggs:		
Wholesalers	389	2
Wholesalers and processors	990	4
Total	1,379	6
Meat and meat products:		
Wholesalers	1,333	6
Slaughterers	2,952	12
Total	4,285	18
Dry groceries and frozen foods	2,612	11
Food chain organizations:		
Fresh fruits and vegetables	2,091	9
Poultry and eggs	427	2
Meat and meat products	2,180	9
Dry groceries and frozen foods	3,813	16
Total	8,511	36
Grand total	23,534	100

Marketing Areas

In 1958 there were four areas of Knoxville that could be considered centers of food marketing: (1) Market Square area, (2) Western Avenue Market area, (3) Forest Avenue Market area, and (4) Jackson Avenue area. The Market Square area was primarily for retail sales; the Western Avenue Market served a dual purpose--tobacco warehouse and farmers' market--and had both wholesale and retail sales; the Forest Avenue Market area and the Jackson Avenue area were devoted primarily to wholesale sales.

Some of the background of the present wholesale food marketing areas was reported by the Tennessee Agricultural Experiment Station study in 1940 (5, Part IV).

> "The need for a wholesale fruit and vegetable market in Knoxville was evident in 1927. On March 27 of that year the City Council designated certain sections of Market Square (in principal retail sections of the city) as places at which sellers were allowed to sell only in wholesale quantities. During 1930 and 1931 a portion of an arterial street passing around the principal retail section (Henley Street) was used as a farmers' market.
>
> "Just prior to the marketing season of 1932 a committee of farmers are said to have requested the present management of the Western Avenue Market to provide a space for fruits and vegetables in their tobacco warehouse. The management granted the request and the market has continued in operation since that time. The Western Avenue Market has functioned as a fruit and vegetable market while these commodities were in season, and as a tobacco market during December, January, and part of February."

The year after that report was written several of the wholesale fresh fruit and vegetable handlers moved from the Western Avenue Market into new facilities on Forest Avenue. Various new facilities have been added at the Forest Avenue Market in the succeeding years and at the present time only a farmers' market is located in the Western Avenue Market area.

The Market Square Municipal Farmers' Market included a multiple-story brick building containing approximately 25 retail business establishments rented on a permanent basis. The businesses specialized in meat, seafood, and poultry and were interlaced with lunch counters. Also in the middle of this area were a number of stands rented on a daily basis primarily to people selling home handicrafts, home canned products, and other products of the farm. Along the outside of the building and on the street surrounding it were parking spaces for 76 vehicles. Retailers occupying these spaces sold fresh fruits and vegetables, homemade jellies and relishes, and flowers and nursery stock. This marketing area was not given further consideration because the business was mainly retail, which was outside the scope of this study.

The Western Avenue Market (figure 3) was located on Dale Avenue below the Western Avenue overpass and consisted of warehouse buildings which were used for

tobacco sales from November to February of each year. During the remainder of the year, local producers used the warehouse as a farmers' market. Although actual data were not available, there were between 70 and 150 producers and truckers who normally patronized the market. At peak periods as many as 250 producers and truckers were on the market. During a study of the Knoxville farmers' market made by the Tennessee Experiment Station 4/ during August of 1958, there was an average of 111 producers on the market.

BN-9873X

BN-9872X

Figure 3.--Two views of entrance to Western Avenue Market, Knoxville, Tenn.

4/ Unpublished study of W. E. Goble, Tenn. Agr. Exper. Sta., 1958.

The Forest Avenue Market area (figure 4) was considered to be roughly the area between 20th and 23rd streets and from Forest Avenue to the railroad. This area included 31 fresh fruit and vegetable dealers. In addition, along Forest Avenue there were 12 spaces for trailer parking (figure 5). These spaces were provided at a daily fee for transient trucker-jobbers. Also located in the area were facilities of one of the dry grocery firms and the meat and produce warehouse of one of the food chain organizations. This area also is the location of the Southern Railway team tracks and the Louisville & Nashville Railroad and Southern Railway's interchange.

BN-9877X

Figure 4.--View of Forest Avenue Market, Knoxville, Tenn.

BN-9871X

Figure 5.--Trucker-jobber selling from parking areas, Forest Avenue Market, Knoxville, Tenn.

The Jackson Avenue area (figure 6) is the area along Jackson Avenue between Williams and Kentucky Avenues and includes some facilities located on the various cross streets. This area is one of the older food handling areas of the city and contained three of the five dry grocery firms. Also located in this area were two poultry and egg handlers, one of whom did some processing, the two packer branch houses, a meat wholesaler, and a large meat packer. In addition, the dry grocery warehouse of one of the food chain organizations was located here.

Thus 41 wholesale firms and parts of 2 chain organizations were located in 2 market areas containing wholesale food handlers. The remaining 18 firms and parts of food chain organizations were scattered throughout Knoxville and surrounding Knox County.

The location of the marketing centers and of the wholesalers outside these areas may be seen in figure 2.

BN-9878X

BN-9874X

Figure 6.--Two views of wholesale food handling facilities, Jackson Avenue Market, Knoxville, Tenn.

Wholesale Marketing Facilities

Fresh Fruits and Vegetables

Facilities of the fresh fruit and vegetable wholesalers were generally one- or two-story structures without loading platforms or rail house tracks. Of the 14 carlot receivers, 5 dealers made use of a second floor, 2 had house tracks, and 3 had loading docks. The remaining carlot receivers had none of these facilities although 10 used a blacktopped area in front of their stores (a total of 4,604 square feet) to display merchandise. Ten of these carlot receivers used 3,500 square feet of office space (350 square feet per wholesaler), while 11 of them had refrigerated and ripening rooms containing a total of 25,244 square feet (2,295 square feet per wholesaler). The 14 carlot receivers used a total of 105,565 square feet, or an average of 7,540 square feet per dealer.

Commodity specialists occupied similar facilities except that 8 of the 11 dealers utilized two stories. On the average, they used less space than the carlot receivers. Six had offices totaling 588 square feet (or an average of 98 square feet per office). All 11 dealers had refrigerated space and ripening rooms totaling 11,780 square feet (or 1,071 square feet per dealer) and 5 used ground level space in front of their stores to display merchandise and to store equipment. Commodity specialists used a total of 45,760 square feet of space (or 4,160 square feet per dealer).

Facilities of the 8 trucker-jobbers were similar to those of both the commodity specialists and carlot receivers, except that most of the operations were on the ground floor. Only one of the trucker-jobbers used second floor space (540 square feet). The average size of these facilities was substantially smaller than that of the other types of fruit and vegetable dealers (1,370 square feet--or 18 percent as large as for carlot receivers). Four trucker-jobbers had 196 square feet of office space, averaging 49 square feet per office; six had 2,000 square feet of space in refrigerated coolers for an average of 333 square feet per dealer; and seven used 748 square feet of space in front of their stores (107 square feet per user). Trucker-jobbers used a total of 10,960 square feet.

All fruit and vegetable dealers in Knoxville occupied an average of 1.4 floors and a total of 162,285 square feet of space. Of the total space, 128,325 square feet, or 79 percent of the space, was on the first floor. The estimated floor space used, number of floors per dealer, and distribution of space by floors may be seen in tabular form in table 3.

About one-half of all wholesale fresh fruit and vegetable dealers, or 17 of 33 dealers, owned their facilities. This proportion was similar for all types of dealers except for trucker-jobbers, most of whom rented their facilities. The tabulation of tenure status for fresh fruits and vegetables as well as for the other commodities by type of dealer is also shown in table 3.

Table 3.--Tenure status and space used by wholesale food dealers, Knoxville, 1958

Type of wholesaler	Tenure status: Wholesalers renting facilities	Tenure status: Wholesalers owning facilities	Average floors per building	Estimated floor space used: Space on 1st floor	Estimated floor space used: Space on other floors	Estimated floor space used: Total space	Average space per wholesaler
	Number	Number	Number	Sq.ft.	Sq.ft.	Sq.ft.	Sq.ft.
Fresh fruits and vegetables:							
Carlot receivers	5	9	1.4	86,245	19,320	105,565	7,540
Commodity specialists	3	8	1.7	31,600	14,100	45,760	4,160
Trucker-jobbers	8	0	1.1	10,420	540	10,960	1,370
Total	16	17	1.4	128,325	33,960	162,285	4,918
Poultry and eggs:							
Wholesalers	2	1	1.3	7,404	207	7,611	2,537
Wholesalers and processors	0	4	1.8	35,291	16,116	51,407	12,852
Total	2	5	1.6	42,695	16,323	59,018	8,431
Meat and meat products:							
Wholesalers	2	5	1.4	37,416	15,800	53,216	7,602
Slaughterers	0	3	3.0	104,562	55,089	159,651	53,217
Total	2	8	2.2	141,978	70,889	212,867	21,287
Dry groceries and frozen foods	2	5	1.6	150,600	53,610	204,210	29,173
Food chain organizations 1/	0	2	1.0	137,950	--	137,950	68,975
Grand total	22	37	1.3	601,548	174,782	776,330	13,158

1/ Two food chain organizations not having warehouse facilities in Knoxville excluded.

Poultry and Eggs

Poultry and egg wholesale dealers, dressing poultry as part of their business, differed statistically from those not dressing poultry. The 3 wholesalers who did not dress poultry occupied 7,611 square feet and averaged 2,537 square feet per dealer; about 97 percent of this space was on the first floor. One dealer had an office of 300 square feet; two had refrigerated space of 570 square feet, including one who had 100 square feet of freezer space. One of the dealers used a platform or sidewalk in his sales operations.

Those dealers who did poultry dressing had facilties which were, on the average, over 5 times as large as the other poultry and egg wholesalers. They had 8,624 square feet of office space (2,156 square feet per firm) and 2,693 square feet of refrigerated space (673 square feet per firm), including 536 square feet of freezer space used by one firm, but not including space used by some firms that cooled their freshly-dressed poultry with ice. Only one of these poultry dressers was under Federal poultry inspection at the time of the study.

Poultry and egg wholesalers doing processing occupied 51,407 square feet of space, of which 35,291 square feet was first-floor space.

All firms handling poultry and eggs and processing poultry used 59,018 square feet of space, 72 percent of which was on the first floor.

Meat and Meat Products

Meat and meat product wholesalers had facilities similar in size to those of the carlot receivers of fruits and vegetables. Packer branch houses were also included in this classification so that individual data would not be disclosed.

One wholesaler and the two packer branch houses used 2,316 square feet of office space (772 square feet per office). These same firms also had 744 square feet (248 square feet for each firm) in loading platforms. Three of the wholesalers and the packer branch houses had 8,060 square feet in refrigerated space, including 4,243 square feet in freezer space, or an average of 1,612 square feet of refrigerated space including 849 square feet of freezer space. One of the firms had a multiple-story facility while the other firms were located in single-story facilities. All seven meat wholesalers used a total of 53,216 square feet of space.

The slaughterers had sizable, extensive, and often rambling facilities. The slaughterers used 159,651 square feet of which 104,562 square feet (or 65 percent) was first-floor space and included 34,600 square feet in live-animal holding pens. These firms had 22,900 square feet in offices, substantial amounts of refrigerated space, and 3,075 square feet of loading platforms.

All the firms handling meat and meat products used a total of 212,867 square feet or 21,287 square feet per firm, including 141,978 square feet of first-floor space.

Dry Groceries and Frozen Foods

Generally the facilities occupied by the dry grocery and frozen food firms were relatively old structures although one dry grocery firm had a relatively new and well-designed facility. These firms had 7,210 square feet of office space. Four firms had 20,454 square feet of refrigerated space, including 14,254 square feet of freezer space. Three firms had 35,000 square feet of loading platforms. All of these wholesalers used 204,210 square feet of space, 74 percent of which was first floor space.

Food Chain Organizations

Since two of the food chain organizations included in this study had no wholesale facilities in Knoxville, this discussion of facilities will exclude them. Each of the two food chain organizations having warehouses in Knoxville had separate warehouses for perishables and dry groceries. These firms used 137,950 square feet--all on the first floor. They had 6,050 square feet of office space, 9,900 square feet of refrigerated space, including 900 square feet of freezer space, and 16,000 square feet of platform space. A view of a food chain organization dry grocery warehouse may be seen in figure 7.

BN-9875X

Figure 7.--View of food chain organization dry grocery warehouse, Knoxville, Tenn.

Public Refrigerated Warehouse

The public refrigerated warehouse operated with 750,000 cubic feet of refrigerated space, including 550,000 cubic feet of freezer space. Additional data about this firm has not been included to prevent the disclosure of confidential data.

SOURCE OF SUPPLIES

The commodities handled by the wholesale food dealers in Knoxville originated in local production areas of Tennessee as well as in major production areas throughout the country. Local production accounted for 1 percent of the volume handled in Knoxville. The rail volume accounted for about 10 percent of the total. The remaining 89 percent was trucked from various other producing areas.

Fresh Fruits and Vegetables

About 14 percent (924 carlots) of the fresh fruits and vegetables handled in the wholesale market (not including food chain receipts) was produced locally in 1958; 5/ 806 carlots went to farmers' markets and 118 carlots were sold directly to local wholesalers. This volume does not include an undetermined volume of local production which was sold directly to consumers or retailers.

During August 1958 an intensive study made by the Tennessee Experiment Station revealed that 111 producers selling on the Western Avenue Farmers' Market averaged about 2.8 acres of vegetables. This acreage was made up of green corn, 35 percent; tomatoes, 12 percent; green beans, 8 percent; greens, 7 percent; followed by cantaloupes, grapes, lima beans, okra, potatoes, and apples. The total acreage grown by all producers interviewed represented less than 0.9 percent of the fruits and vegetables grown in the 32 counties of origin. 6/

Growers selling produce on Western Market indicated that they disposed of their products primarily to retail grocers, consumers, hucksters, and transit truckers (fig. 8). They indicated that their largest volume months were August, July, and September. The relative amounts sold in each month may be seen in table 4.

These growers had been selling on the Western Avenue Market for an average of 15 years and averaged two to three trips per week to the market. Over 63 percent of the growers estimated that their total gross sales from all products sold from their farms were under $2,000 annually; only 8 percent indicated total gross sales in excess of $7,000.

Shipments of fresh fruits and vegetables by rail originated in 13 States and Mexico. Most of these receipts came from western States although some carlots were shipped from Florida and Gulf States. Commodities most frequently arriving by rail included citrus, potatoes, lettuce, and apples. Rail receipts were mainly received by carlot receivers.

5/ See footnote p. 12.

6/ Adapted from information on 1958 fruit and vegetable production supplied by individual county representatives of Commodity Stabilization Service, U. S. Dept. Agr.

BN-9876X

Figure 8.--View of produce for sale on Western Avenue Market, Knoxville, Tenn.

Receipts by truck accounted for the majority of fresh fruits and vegetables received by Knoxville dealers. Truck receipts originated in many States and two foreign countries (by auto-ferry from Cuba and truck from Mexico). However, the majority of the receipts were from Florida, Georgia, and Texas.

Poultry and Eggs

Over 38 percent of the total volume of poultry and eggs handled by independent dealers came from within a 50-mile radius of Knoxville. This area supplied the market 180 carlots of eggs and 345 carlot equivalents of live poultry. The majority of the remaining poultry and eggs came from the area south of Knoxville extending into Georgia production areas, although some receipts - especially eggs and occasionally dressed poultry - came from the Midwest. Substantial volumes of eggs moved directly from producers to consumers through the farmers' market and by private sales.

Meat and Meat Products

Local slaughterers supplied 69 percent of the meat and meat products handled in Knoxville by independent dealers. Of this volume almost half was meat from live animals raised in east Tennessee. Other live animals were received from points as distant as Fort Worth, Texas. The remaining 31 percent was received from the various midwestern production areas, largely in carcass or processed form.

Table 4.--Percentage of fresh fruits and vegetables handled in each month as estimated by 111 growers on Western Avenue Market during August 1958

Month	Total sold	Month	Total sold
	Percent		Percent
January	1	July	24
February	1	August	33
March	1	September	21
April	2	October	4
May	3	November	2
June	7	December	1

Dry Groceries and Frozen Foods

Dry groceries and frozen foods were received from almost all States and many foreign areas. However, most dry groceries were received from sources in the Midwest, especially Chicago. Some frozen foods, especially berries and vegetables, were received from Tennessee production areas.

Food Chain Organizations

Much of the preceding discussion in this section regarding sources of supplies for individual commodity groups also applies to the food chains having warehouse facilities in Knoxville. However, two of the chain organizations which do not have warehouse facilities in the area obtain supplies from central warehouses located within a 200-mile radius. Specific information about the sources of supplies for the two organizations having Knoxville warehouse facilities is not shown in order to prevent disclosure of confidential data.

DISTRIBUTION OF SUPPLIES

The areas into which food commodities were distributed from Knoxville varied substantially between commodities. Meat slaughterers distributed products into large areas, including parts of Georgia, Kentucky, North Carolina, Virginia, and much of Tennessee. There were also substantial shipments of repacked tomatoes to cities such as Louisville, Ky., Detroit, Mich., Cleveland, Ohio,and Pittsburgh, Pa. In contrast, meat wholesalers rarely distributed their products farther than 40 miles from Knoxville.

Considering only counties which obtain substantial percentages of their food from Knoxville, there were 26 Tennessee counties, 9 Kentucky counties, 5 North Carolina counties, and 4 Virginia counties which comprised the Knoxville distribution area (see fig. 9). This area had a population estimated at 1,706,300 in 1957.

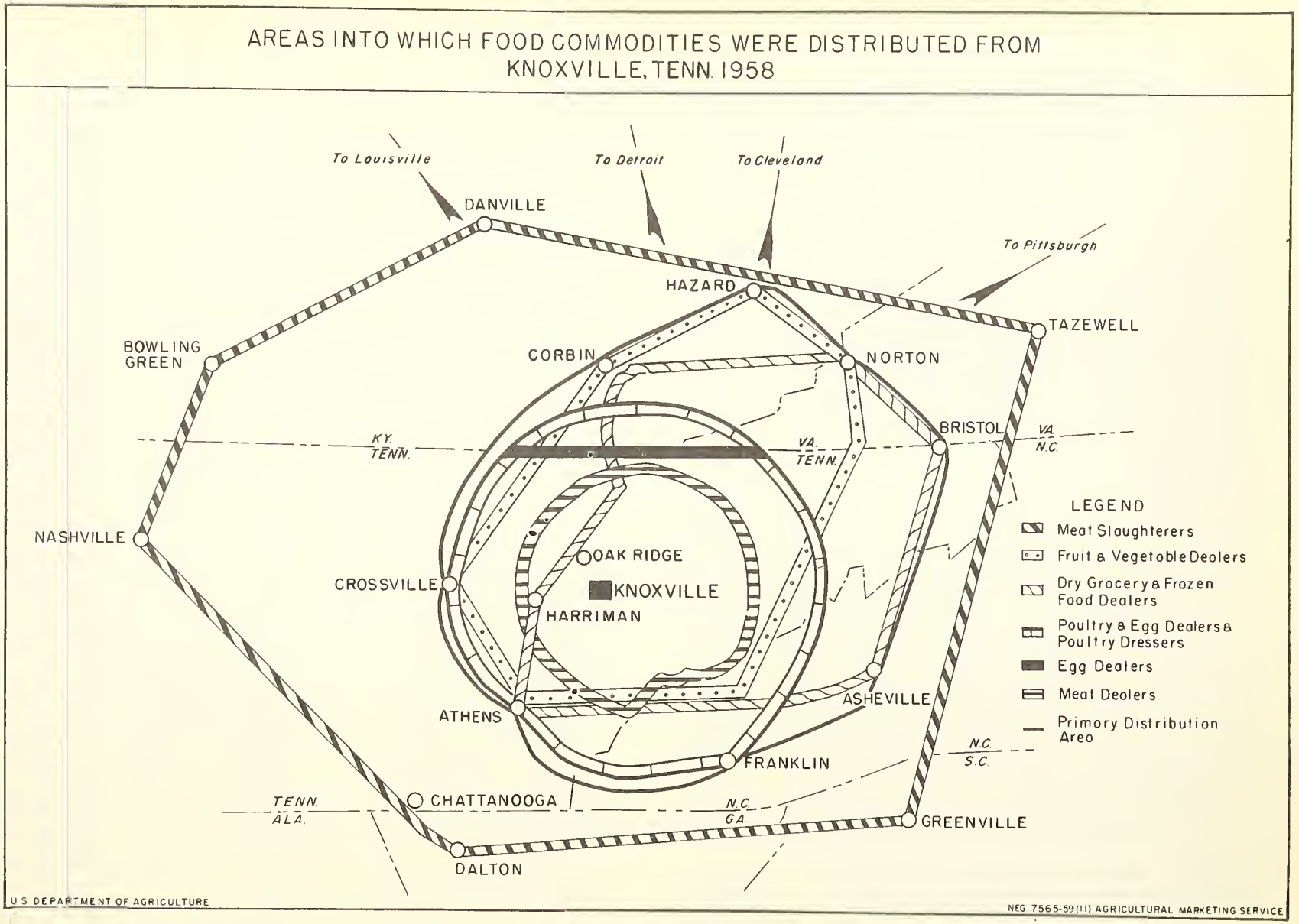
AREAS INTO WHICH FOOD COMMODITIES WERE DISTRIBUTED FROM KNOXVILLE, TENN. 1958
To Louisville
To Detroit
To Cleveland
To Pittsburgh
DANVILLE
HAZARD
TAZEWELL
BOWLING GREEN
CORBIN
NORTON
BRISTOL
KY.
TENN.
VA.
TENN.
VA.
N.C.
NASHVILLE
OAK RIDGE
KNOXVILLE
CROSSVILLE
HARRIMAN
ASHEVILLE
ATHENS
FRANKLIN
N.C.
S.C.
TENN.
ALA.
CHATTANOOGA
N.C.
GA.
GREENVILLE
DALTON
LEGEND
Meat Slaughterers
Fruit & Vegetable Dealers
Dry Grocery & Frozen Food Dealers
Poultry & Egg Dealers & Poultry Dressers
Egg Dealers
Meat Dealers
Primary Distribution Area
U S DEPARTMENT OF AGRICULTURE
NEG 7565-59(11) AGRICULTURAL MARKETING SERVICE

Figure 9

A total of 11,888 carlots, or 51 percent of all commodities, were distributed inside the Knoxville metropolitan area (Knox, Anderson, and Blount Counties). An additional 2,475 carlots, or 10 percent, were distributed to wholesalers outside the metropolitan area, and 9,171 carlots, or 39 percent, were distributed to retailers outside the metropolitan area. Of the total volume handled, 17,472 carlots, or 74 percent, were delivered by the wholesalers while 6,062 carlots, or 26 percent, were picked up at the facility of the wholesaler. Commodity distribution by areas and by method of distribution is shown in tables 5 and 6.

Table 5.--Quantity of food distributed inside and outside the metropolitan area by 61 Knoxville wholesalers, 1958

Type of wholesaler	Inside metropolitan area	Outside metropolitan area: To wholesalers	Outside metropolitan area: To retailers	Total distributed
	Carlots	Carlots	Carlots	Carlots
Fresh fruits and vegetables....	2,567	1,383	2,797	6,747
Poultry and eggs.....	717	471	191	1,379
Meat and meat products.....	1,457	417	2,411	4,285
Dry groceries and frozen food..	1,019	204	1,389	2,612
Food chain organizations.....	6,128	0	2,383	8,511
Total.....	11,888	2,475	9,171	23,534

Table 6.--Method of distribution by 61 Knoxville wholesalers, 1958

Type of wholesaler	Delivered by wholesaler	Picked up by customer	Total distributed
	Carlots	Carlots	Carlots
Fresh fruits and vegetables....	1,552	5,195	6,747
Poultry and eggs.....	978	401	1,379
Meat and meat products.....	4,028	257	4,285
Dry groceries and frozen food..	2,403	209	2,612
Food chain organizations.....	8,511	0	8,511
Total.....	17,472	6,062	23,534

Fresh Fruits and Vegetables

Fresh fruits and vegetables were distributed into an area consisting of northeastern Tennessee, southeastern Kentucky, southwestern Virginia, and western North Carolina (see fig. 9). Most of this area is heavily mountainous and

sales were made to retail stores in the numerous small towns of the area and to peddlers and hucksters making roadside and door-to-door sales. The area of distribution for fresh fruits and vegetables differed from the primary distribution area in that local dealers did not serve the Bristol area or the Asheville, N. C. area.

Because of the presence of several tomato repackers in Knoxville who supplied more than local demand, substantial shipments of repacked tomatoes moved outside the distribution area.

About 39 percent of the total volume handled by Knoxville dealers was distributed inside the Knoxville metropolitan area; 20 percent was distributed to wholesalers outside the metropolitan area; and the remaining 41 percent was distributed to retailers outside the area. The majority, or 77 percent of all fresh fruits and vegetables, was picked up at the dealers' stores. Large dealers in Morristown and Maryville also served this distribution area, but dealers in these cities were not included in the Knoxville study.

Poultry and Eggs

The poultry and egg distribution area was roughly similar to the fruit and vegetable area, but extended only short distances into Kentucky and Virginia. Especially after enactment of the compulsory Federal poultry inspection laws, effective in 1959, Knoxville dealers rarely shipped poultry outside the State of Tennessee. One poultry processor was under Federal inspection and shipped poultry to many of the large population centers in the midwest and on the east coast. Unlike poultry, eggs were shipped into parts of southeastern Kentucky and southwestern Virginia.

About 52 percent of the total volume of poultry and eggs handled by dealers in Knoxville was distributed inside the metropolitan area. Of the remainder, 34 percent was distributed to wholesalers outside the metropolitan area and 14 percent was sold to retailers outside the area. Knoxville poultry and egg wholesalers delivered 71 percent of the volume they handled. Additional volumes of poultry and eggs were delivered directly to retailers inside the Knoxville distribution areas by wholesalers in Chattanooga and northern Georgia. Volumes moving from outside sources directly to retailers and consumers were not considered in this study.

Meat and Meat Products

Distribution areas of Knoxville meat wholesalers differed substantially from those of Knoxville meat slaughterers. Meat wholesalers, distributing primarily inside the metropolitan area, distributed only into limited areas outside the metropolitan area while meat slaughterers distributed meat and meat products into all of east Tennessee, parts of middle Tennessee, and parts of Kentucky, Virginia, North Carolina, and Georgia. Two of the slaughterers were under Federal inspection.

Meat and meat product wholesalers distributed 34 percent of their volume into the Knoxville metropolitan area, 10 percent to wholesalers outside the

metropolitan area, 56 percent to retailers and restaurants outside the area. Over 94 percent of the volume handled by these dealers was delivered by them. Not included in this study were many meat slaughterers and wholesalers distributing inside the Knoxville distribution area but who were located outside the area. One large slaughterer located in Lenoir City was a substantial source of supply even inside the Knoxville metropolitan area.

Dry Groceries and Frozen Foods

Dry groceries and frozen foods were distributed in an area which included parts of southeastern Kentucky, southwestern Virginia, western North Carolina, and much of east Tennessee. Major cities to which dry groceries and frozen foods were distributed, but which were not included in distribution areas of other commodities, included Bristol, Va.-Tenn., and Asheville, N. C.

Dry grocery and frozen food wholesalers distributed 39 percent of their volume into the Knoxville metropolitan area and 8 percent to wholesalers outside the metropolitan area. The remaining 53 percent was distributed directly to retailers and restaurants outside the metropolitan area.

Food Chain Organizations

Two of the food chain organizations maintained warehouse facilities within the Knoxville area while the other two maintained warehouses elsewhere. In the case of the latter two chains, that part of their business which was outside the Knoxville distribution area was excluded from the study. All of these food chains maintained stores in the metropolitan area as well as stores in east Tennessee and surrounding areas.

Knoxville food chain organizations distributed 72 percent of their volume inside the metropolitan area and the remainder to stores in surrounding areas. They delivered the volume that moved through their facilities except the volume delivered directly by the wholesale distributor. At least one other food chain organization had stores within the distribution area but outside the Knoxville metropolitan area. The volume of these stores was not included in the study.

FLOW AND VOLUME HANDLED BY FOOD WHOLESALERS

Although the flow of the various food commodities has been discussed under various topics, it was believed that a flow diagram embodying the complete picture might help clarify the discussion. Such a diagram is presented as figure 10.

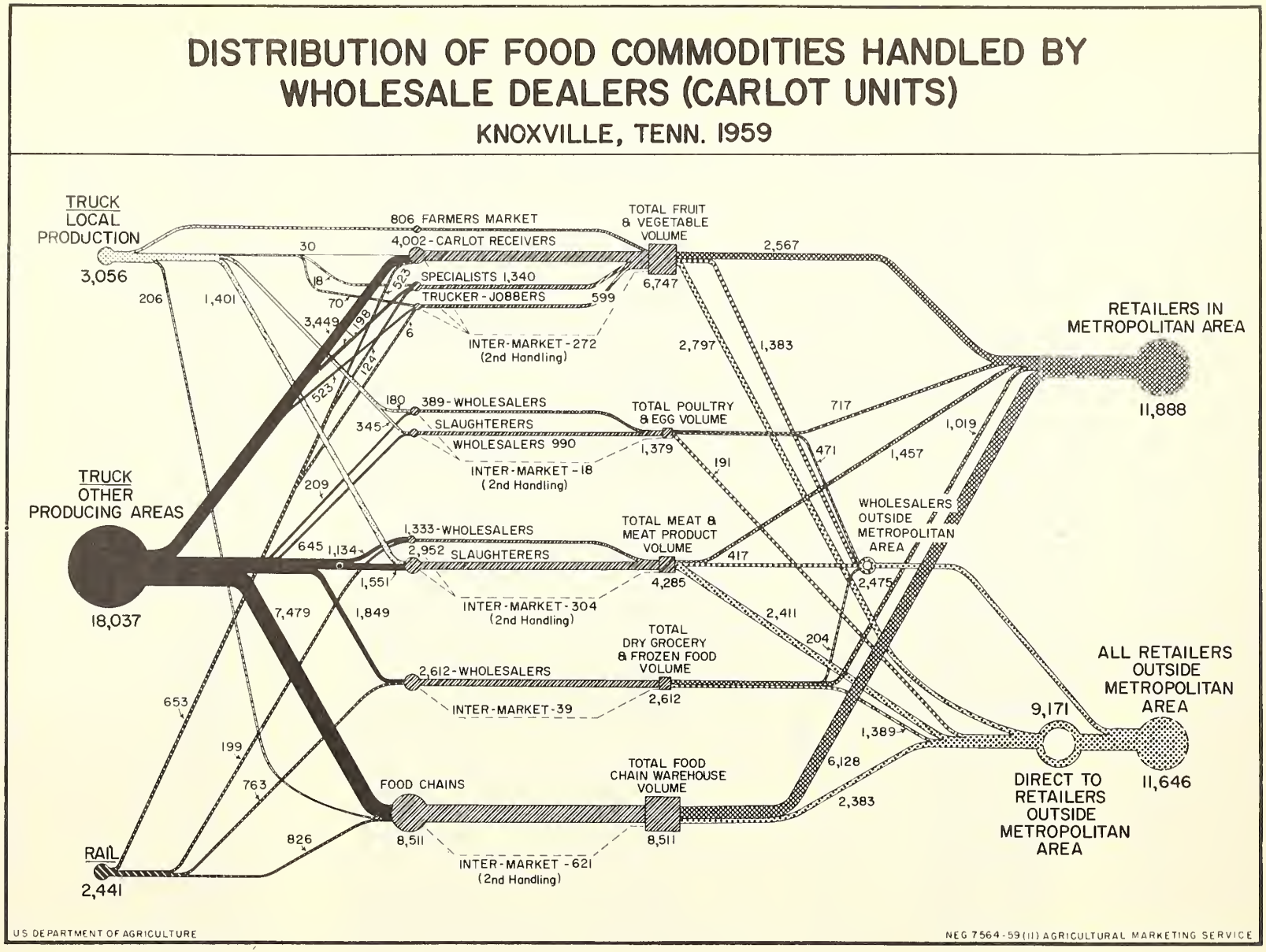
DISTRIBUTION OF FOOD COMMODITIES HANDLED BY WHOLESALE DEALERS (CARLOT UNITS)
KNOXVILLE, TENN. 1959
TRUCK LOCAL PRODUCTION
3,056
TRUCK OTHER PRODUCING AREAS
18,037
RAIL
2,441
806 FARMERS MARKET
4,002 - CARLOT RECEIVERS
SPECIALISTS 1,340
TRUCKER - JOBBERS
INTER-MARKET - 272 (2nd Handling)
TOTAL FRUIT & VEGETABLE VOLUME
6,747
389 - WHOLESALERS
SLAUGHTERERS
WHOLESALERS 990
INTER-MARKET - 18 (2nd Handling)
TOTAL POULTRY & EGG VOLUME
1,379
1,333 - WHOLESALERS
2,952 SLAUGHTERERS
INTER-MARKET - 304 (2nd Handling)
TOTAL MEAT & MEAT PRODUCT VOLUME
4,285
2,612 - WHOLESALERS
INTER-MARKET - 39
TOTAL DRY GROCERY & FROZEN FOOD VOLUME
2,612
FOOD CHAINS
8,511
INTER-MARKET - 621 (2nd Handling)
TOTAL FOOD CHAIN WAREHOUSE VOLUME
8,511
WHOLESALERS OUTSIDE METROPOLITAN AREA
2,475
RETAILERS IN METROPOLITAN AREA
11,888
ALL RETAILERS OUTSIDE METROPOLITAN AREA
11,646
DIRECT TO RETAILERS OUTSIDE METROPOLITAN AREA
9,171
30
18
70
3,449
523
198
6
124
523
180
345
209
645
1,134
1,551
7,479
1,849
653
199
763
826
206
1,401
599
2,567
2,797
1,383
717
1,019
471
1,457
191
417
2,411
204
1,389
6,128
2,383
US DEPARTMENT OF AGRICULTURE
NEG 7564-59 (11) AGRICULTURAL MARKETING SERVICE

Figure 10

The pattern of distribution for food commodities in Knoxville differed from that found in many other cities in that relatively little food was handled by more than one wholesale dealer. A total of 1,254 carlots (including 621 carlots which moved from local wholesalers to food chain warehouses) or 5 percent of the direct receipts was "second handled."

COSTS INCURRED BY FOOD WHOLESALERS

Some costs of moving food through wholesale markets would be the same regardless of the facilities occupied by the dealers. Other costs could be reduced substantially by improved facilities, although not all can be measured readily. Measurable costs which would be affected by any facility improvement would include: (1) Cartage from railroad track or point of initial receipt to wholesaler's store; (2) physical handling of the commodities at the warehouse including unloading at the warehouse and loading for delivery on a truck; (3) interdealer movement costs, or the cost of handling products moved through more than one Knoxville wholesaler; (4) spoilage, breakage, deterioration, and shrinkage; and (5) rental costs or charge for occupancy.

These costs were computed after interviewing wholesalers, examining records of the cost of operation for selected dealers, and analyzing time-study information. These estimates were compared with similar cost studies made for other cities. In computing costs, the wholesalers were so sampled that dealers of all sizes would be included.

Cartage

Cartage costs are those costs incurred in loading and moving commodities from rail tracks or point of initial receipt (such as public-warehouse facilities) to the dealer's store. These costs did not include unloading at stores. Most dry grocery firms and all of the food chains used rail spurs. Firms not served by rail spurs and those using public storage incurred cartage costs. The majority of the fruit and vegetable dealers (31) were located in the Forest Avenue Market area, which was not served directly by rail. This area was served by team tracks located approximately two blocks from the dealers' stores. Cartage costs incurred by wholesalers in Knoxville amounted to $21,845; the average cost per carlot was $30.34. These costs are shown in table 7.

Handling

Handling costs were incurred from the time a commodity was unloaded from trucks or railcars at the dealer's store until it was finally loaded on an outbound truck. Therefore, handling included unloading at the store, moving into the store facility, sorting, reassembling, preparing for loading, and loading onto a truck for delivery. When "over-the-road" truck drivers assisted in unloading at the store the value of their services was included in the dealer's cost although the dealer did not pay the cost directly. This was done so that the handling costs of the various dealers would be comparable.

Table 7.--Cartage costs for food wholesalers, Knoxville, 1958

Commodity group 1/	Volume incurring cartage costs	Cost per carlot	Total cartage cost
	Carlots	Dollars	Dollars
Fruits and vegetables.....	410	29.49	12,090
Dry groceries.....	269	31.65	8,514
Food chain organizations...	41	30.27	1,241
Total or average.....	720	30.34	21,845

1/ Commodity groups other than those listed did not incur cartage.

Comparison of the physical handling costs of the various commodity-group wholesalers indicates substantial differences. The data also indicate that commodities with shorter storage times had lower handling costs. A part of the relatively high costs for the dealers in general was due to inadequacies and deficiencies of some of the present facilities.

The total cost for handling food commodities by wholesalers in Knoxville during 1958 was $1,315,920, or an average cost of $54.87 per carlot. A summary of these costs may be seen in table 8.

Table 8.--Physical handling costs for food wholesalers, Knoxville, 1958

Commodity group	Volume incurring handling cost	Cost per carlot	Total handling cost
	Carlots	Dollars	Dollars
Fruits and vegetables.....	1/ 6,213	35.48	220,437
Poultry and eggs.....	2/ 1,397	48.33	67,517
Meat and meat products.....	3/ 4,589	63.36	290,759
Dry groceries and frozen food.....	4/ 2,651	67.50	179,942
Food chain organizations...	5/ 9,132	61.13	558,265
Total or average.....	23,982	54.87	1,315,920

1/ Does not include 806 carlots through farmers' market but does include 272 carlots intermarket movement.
2/ Includes 18 carlots intermarket movement.
3/ Includes 304 carlots intermarket movement.
4/ Includes 39 carlots intermarket movement.
5/ Includes 621 carlots purchased from local wholesalers.

Interdealer Handling

As previously noted, 1,254 carlots of all commodities were "second handled" by wholesale dealers. Costs of handling the commodities through dealers' stores were included in the handling costs of those dealers, but the cost of moving the commodities from one store to another was not.

The methods of movement varied from porters carrying a bag of potatoes next door to the cross-town movement of large semitrailer trucks. Therefore, there was considerable variation in costs between different types of wholesale dealers because of the location and other factors involved. The total cost of moving products from one wholesaler to another in Knoxville for 1958 was $39,337, or an average per carlot of $31.37. These costs are shown in table 9.

Table 9.--Interdealer physical handling costs for food wholesalers, Knoxville, 1958

Commodity group	Volume incurring interdealer cost	Cost per carlot	Total cost
	Carlots	Dollars	Dollars
Fruits and vegetables.....	272	24.82	6,751
Poultry and eggs.....	18	26.61	479
Meat and meat products.....	304	36.92	11,224
Dry groceries and frozen food.....	39	34.05	1,328
Food chain organizations...	621	31.49	19,555
Total or average.....	1,254	31.37	39,337

Spoilage, Deterioration, Breakage, and Shrinkage

Costs for spoilage, deterioration, breakage, and shrinkage have been estimated for the various commodities. These costs might be materially reduced if less handling were required or if handling were improved.

Such costs were higher than average for perishable commodities. Costs were computed from estimates given by local dealers and confirmed by records kept by some dealers. The average cost per carlot represented about 1-1/4 percent of the average value per carlot. The cost of spoilage, deterioration, breakage, and shrinkage for all wholesale food dealers in Knoxville in 1958 was $733,500, or $32.23 per carlot. These costs, by commodity groups may be seen in table 10.

Table 10.--Cost of spoilage, deterioration, breakage, and shrinkage incurred by food wholesalers, Knoxville, 1958

Commodity group	Volume incurring losses 1/	Cost per carlot	Total cost
	Carlots	Dollars	Dollars
Fruits and vegetables	5,941	48.24	286,603
Poultry and eggs	1,379	25.60	35,302
Meat and meat products	4,285	33.70	144,405
Dry groceries and frozen food	2,612	20.45	53,415
Food chain warehouses	8,511	25.00	212,775
Total or average	22,728	32.23	732,500

1/ Does not include 806 carlots through farmers' market.

Rental or Occupancy Charge

Part of the data collected when individual wholesale dealers were interviewed was the annual rent paid. Certain problems complicated the process of getting rental figures from those dealers owning their facilities since some of these dealers did not feel qualified to estimate a "reasonable rental value" for their premises. In such instances the average rental for the commodity group was assumed to apply.

The actual rent paid by individual wholesalers varied substantially--between 34 cents and $5.13 per square foot per year. There was also considerable variation within a commodity group.

The highest cost per square foot was paid by the dry grocery and frozen food wholesalers. This, in part, was because of the large amount of refrigerated space required for frozen food. The low cost per square foot for poultry and egg wholesalers was probably due to the location of the majority of dealers in low rent areas. Fruit and vegetable wholesalers had very low rents per carlot because their ratio of "turnover" was high. The total annual cost for rentals in Knoxville in 1958 for all wholesalers except the two food chain warehouses was $464,780, with an average cost of $0.73 per square foot, or $32.69 per carlot handled. (table 11).

Summary of Selected Marketing Costs

As may be seen in table 12, the estimated 1958 costs for cartage; handling; interdealer movement; spoilage, deterioration, breakage, and shrinkage; and rentals or occupancy charge (excluding two food chain warehouses) amounted to more than $2.5 million. About 51 percent ($1,315,920) of these costs was directly attributable to handling costs. The high cost ($791,836, excluding rent) incurred by the wholesale chains can be attributed to their large, varied volumes and the nature of their warehousing facilities and operations.

Table 11.--Rental or occupancy charge for Knoxville food wholesalers, 1958

Commodity group	Volume handled	Rental cost per carlot	Area used in building	Cost per square foot	Annual rental value
	Carlots	Dollars	Square feet	Dollars	Dollars
Fruits and vegetables	1/ 5,941	12.65	162,285	0.46	75,180
Poultry and eggs	1,379	28.63	59,018	0.67	39,480
Meat and meat products	4,285	52.16	212,867	1.05	223,510
Dry groceries and frozen food	2,612	48.47	204,210	0.62	126,610
Food chain organizations	8,511	2/	137,950	2/	2/
Total or average	22,728	3/32.69	776,330	4/ .73	464,780

1/ Does not include 806 carlots handled at the farmers' markets.
2/ Not revealed to prevent disclosure.
3/ Average based upon 14,217 carlots because of the exclusion of chain organization receipts.
4/ Average based upon 638,380 square feet because of the exclusion of chain organization area.

Table 12.--Summary of selected costs incurred by Knoxville food wholesalers, 1958

Commodity group	Cartage	Handling	Inter-dealer movement	Spoilage, breakage, deterioration and shrinkage	Rental or occupancy charge	Total
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Fruits and vegetables	12,090	220,437	6,751	286,603	75,180	601,061
Poultry and eggs	0	67,517	479	35,302	39,480	142,778
Meat and meat products	0	290,759	11,224	144,405	223,510	669,898
Dry groceries and frozen foods	8,514	178,942	1,328	53,415	126,610	368,809
Food chain organizations	1,241	558,265	19,555	212,775	1/	791,836
Total	21,845	1,315,920	39,337	732,500	464,780	2,574,382

1/ Not revealed to prevent disclosure.

Other Marketing Costs

Buyers using the present market facilities had difficulty finding adequate parking, and in addition it was necessary to visit several wholesale stores located in various areas to complete purchases. As a result of this situation, buyers' expenses were increased. These costs were compounded by additional costs involved in loading trucks and interference in leaving the often congested areas.

Wholesalers and employees were apt to work long, hard hours under less than optimum conditions. The commodities moving through facilities were often handled manually rather than with labor saving devices.

The local government shares in the expense of operating the present facilities by maintaining extra fire and police protection, and also in the difficult problem of street sanitation. The various market areas were in many cases little improvement to the surrounding area's property values or tax basis. Often, lack of access cost transportation companies additional business, or wholesalers had to pay extra amounts for handling and transportation. Transportation agencies, buyers, wholesalers, producers, and consumers (local government) incur extra expense when a market is not operated with reasonable efficiency.

PRINCIPAL INADEQUACIES OF FACILITIES AND OPERATIONS

During the study of the wholesale food handling facilities of Knoxville it was observed that most of the dealers were operating in facilities where economical, efficient handling of food was difficult. Most of the facilities had inadequate platforms or none at all, thereby increasing the cost of handling. Many stores lacked house rail spurs or made no use of them, thus, in many cases, incurring extra cartage costs. In addition to these costs and because of inefficient handling,costs incurred for spoilage, deterioration, breakage, and shrinkage were higher than in a modern wholesale market. An interior view of a fruit and vegetable facility may be seen in figure 11.

Additional difficulty was encountered where stores had inadequate entrances or a single entrance through which all commodities moved. These inadequate entrances not only caused inconvenience of access but made it extremely difficult for the dealer to make proper use of the rear of his store or its upper levels. It was because of these deficiencies that the cost of handling into, within, and loading out of a store was frequently excessive.

Many stores had inadequate toilets and washrooms, others had none. This situation was made more acute because of the lack of public toilets and washrooms in the wholesale market areas.

Many of the present market areas lacked adequate parking areas not only for incoming trucks but also for employees and customers. Lack of adequate parking was particularly pronounced in the Western Avenue and Jackson Avenue areas and at times there was difficulty in the Forest Avenue area. The same situation was found to exist for many wholesale dealers located outside the major marketing areas.

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Figure 11.--Interior view of fruit and vegetable wholesale facility, Knoxville, Tenn.

Assembly for individual buyers was a difficult and costly task because many wholesale stores were located throughout the metropolitan Knoxville area. This situation also compounded the difficulty of price-making and often caused dissimilar prices for similar products.

Although efforts had been made to regulate hours by agreement, at the time of this study wholesale dealers in some commodities operated largely on a "can to can't" basis or from the first customer to the last. Such hours made for inefficient use of labor and management time, thereby increasing costs of operations. Many employees were working 10 to 12 hours a day from $5\frac{1}{2}$ to 7 days a week.

Many of the wholesale facilities of rapidly expanding businesses were locked in crowded areas in which expansion of facilities was expensive. This situation was a limiting factor not only for individual growth but also for growth of this area of Knoxville's economy.

The inadequacies and deficiencies evident in the present wholesale food handling operations and facilities in Knoxville could be remedied by either of two alternatives: Remodeling of the present facilities or the development of a new wholesale food center. The existing facilities, being of various types and widely scattered, would be prohibitively expensive to remodel and, therefore, the wholesale food center needed will be discussed.

FACILITIES NEEDED FOR A WHOLESALE FOOD CENTER IN KNOXVILLE

Five principles basic to the development of plans for a wholesale food distribution center are:

1. Suitability of design for buildings
2. Proper arrangement and grouping of facilities
3. Adequacy for both present and future needs
4. Location
5. Cost

The kind and amount of facilities planned for the food center are based on the estimated volume of business and general requirements of the 61 dealers presently engaged in business in Knoxville. These dealers handled 23,534 carlots in 1958. In addition, the plan, as may be seen in figure 14, includes space for certain allied food industries.

Operations of these firms were such that it seemed desirable to provide several types of facilities. Facilities recommended include (1) multiple-store buildings which house stores for several firms; (2) detached buildings, with space for one wholesale dealer; and (3) miscellaneous specialized facilities. In general, wholesalers handling large volumes and those requiring special features should be located in detached buildings while dealers not requiring such special features and those who do not handle large volumes could most economically be situated in multiple-store units. Specific recommendations will be discussed by commodity.

The number of wholesalers and the volume of business that would actually go into the food distribution center would be determined by the number of responsible wholesalers who would lease or construct buildings in it. Therefore, the actual number of facilities would be based upon space needed for volume of responsible tenants who will sign firm leases for it.

Fresh Fruits and Vegetables

The fruit and vegetable wholesalers would require 34 multiple-store units to handle the 1958 volume of the 14 carlot receivers and 11 commodity specialists. Carlot receivers would require 20 units and commodity specialists would need 14 units. In addition, 20 smaller multiple-units were planned for trucker-jobbers, truckers presently selling from trailers, and growers selling on a year-round basis.

Also included were 150 stalls in two buildings to provide farmer sheds, 100 open-type farmer stalls, and a container shed. Facilities not for the exclusive use of fruit and vegetable wholesalers but included in their general area were 20 second-floor offices over one of the multiple-store buildings, a restaurant in one multiple-store building, and public restrooms in the basement of that building.

The total space planned for fresh fruit and vegetable wholesalers was 190,150 square feet. This would include 57,500 square feet for carlot receivers, 40,250 square feet for commodity specialists, 22,400 square feet for trucker-jobbers and growers, 30,000 square feet in stalls for truckers and growers, 25,000 square feet in open-type stalls for truckers and growers, and 15,000 square feet for a container shed. The space recommended in the proposed food center is about 80,275 square feet less than is presently used.

Multiple Units

In the proposed plan the 34 multiple-store units would be located in two buildings. One building contains 20 units for fruit and vegetable wholesaling and the other contains 24 units of which 14 units would be allocated to fruit and vegetable dealers and 10 units to poultry and egg dealers. Each unit would be 25 feet wide, 60 feet deep, and not less than 18 feet high. A 24-foot covered platform at the front and a 14-foot covered platform at the rear, with 2 feet in the front and rear walls, make the overall depth 100 feet (fig. 12). The roof over the front platform should extend beyond the front platform to provide protection in loading and unloading. The roof-supporting posts should be set back from the edge of the platform so they will not interfere with loading operations. A slight deviation in the width and depth of these store units would not be objectionable, if preferred by the tenants.

The plan provides continuous platforms and floors on the same level. The front platforms are at truckbed height, or about 45 inches high, while the rear platforms are at refrigerated car level, or about 55 inches high. A wooden bumper 6 inches by 8 inches should be bolted to the top of the front and rear platforms to protect them from damage by trucks. A continuous step along the front platform, about half the height of the platform and at least 24 inches wide would accommodate small trucks and pedestrians. Front door openings are 18 to 20 feet wide and rear door openings 8 feet. A smaller door should be provided in the front door to allow pedestrian entrance without opening the entire entrance.

Individual wholesalers may wish to lease two or more units for their operations, so removable partitions with as few columns as possible should be used. Such partitions, however, should be constructed so as to be waterproof. All units in the plan contain mezzanine offices 15 feet deep by 25 feet wide. These mezzanines are at the rear of the store and can be used as offices or for light storage. To allow for construction of mezzanines that would provide adequate space underneath for walk-in coolers or ripening rooms and sufficient height for multiple-pallet stacking, the height of building ceilings would have to be at least 18 feet. All floors and platforms on the first floor level should be concrete with nonskid surface and should be sloped to drains. Heat would be provided by gas or electric space units. Because of variations in requirements of individual wholesalers, each should equip his store with the required amount of refrigeration.

The double parallel rail tracks provided at the rear of each building should be set into the pavement to allow trucks to move over them. These double tracks could furnish extra capacity during peak periods and could be used as team tracks for direct delivery from rail car to buyer's vehicle.

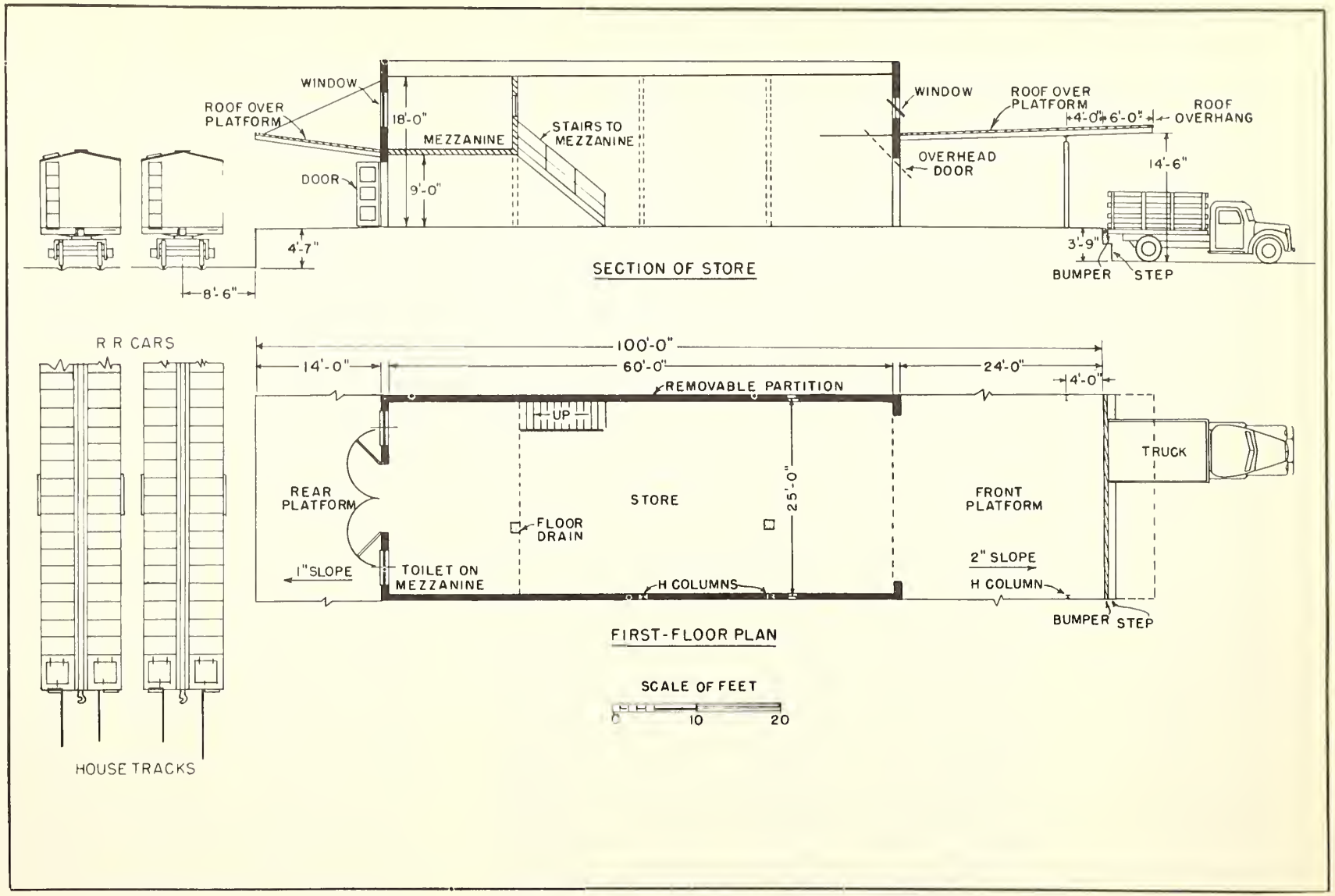

Figure 12.--Suggested plan for multiple-store unit in Knoxville wholesale food center.

Each store unit of the above dimensions contains 1,500 square feet of first floor enclosed space, 375 square feet of mezzanine space, and 1,000 square feet of platform space for a total of 2,875 square feet.

Commodity specialists could use the same type of multiple units since the units are adaptable for handling bananas and repacking tomatoes. At the time of assigning store locations, consideration should be given to interspersing commodity specialists with wholesalers having substantial rail receipts, so that maximum use of the rail sidings could be made.

In addition to the wholesale dealers there were 8 trucker-jobbers, 6 truckers selling from trailers, and 6 growers producing volumes whose operations could not justify larger units. For these dealers 20 multiple units are suggested that would be smaller than standard units and would not be open to the weather like farmers' sheds. In the proposed plan 20 units were provided in one building. Each unit would be 20 feet wide, 40 feet deep, and 13 feet high from floor to ceiling. A 14-foot covered platform, 36 to 40 inches high at the front would make the overall depth 54 feet (fig. 13). The roof over the platform extends beyond the platform for protection during loading and unloading. A continuous step about 2 feet wide and about half the height of the platform would facilitate loading of small trucks and permit buyer access. For these dealers a rear platform was not considered necessary but would not be objectionable if preferred by the tenants. However, each unit should have a rear door. Attention should be given to adequate drainage and proper lighting. Each unit would have an electric or gas space heater. Refrigeration facilities would be the responsibility of the occupant.

Farmers' Sheds

Two farmers' shed buildings containing 150 stalls should adequately provide for all the needs of the 70 to 250 growers who normally use the present Knoxville market in season. Each stall would be 10 feet wide and 20 feet deep. The roof of each shed should be a minimum of 13 feet above the ground and should cover the stall area with an overhang of 6 feet at either edge. The roof should slope to the center to allow proper drainage away from trucks parked under the shed.

Although sheds in many markets are constructed with concrete platforms, it was believed that asphalt surfacing would be adequate and help keep shed costs to a minimum. In light of the present method of sales from the rear of trucks this type of construction seemed adequate. Slight curbing should be placed in and around the sheds to discourage unnecessary traffic. More elaborate sheds and platforms could be built if so desired by farmers or truckers.

Open Stalls

In addition to the covered stalls, 100 open stalls are included in the plan. Open stalls would be areas lined off on asphalt paving. Each open space would be 10 feet wide by 25 feet deep, without platform or roof. Since these stalls would only be used for farm shed overflow at the seasonal peak, they could be used for parking at other times.

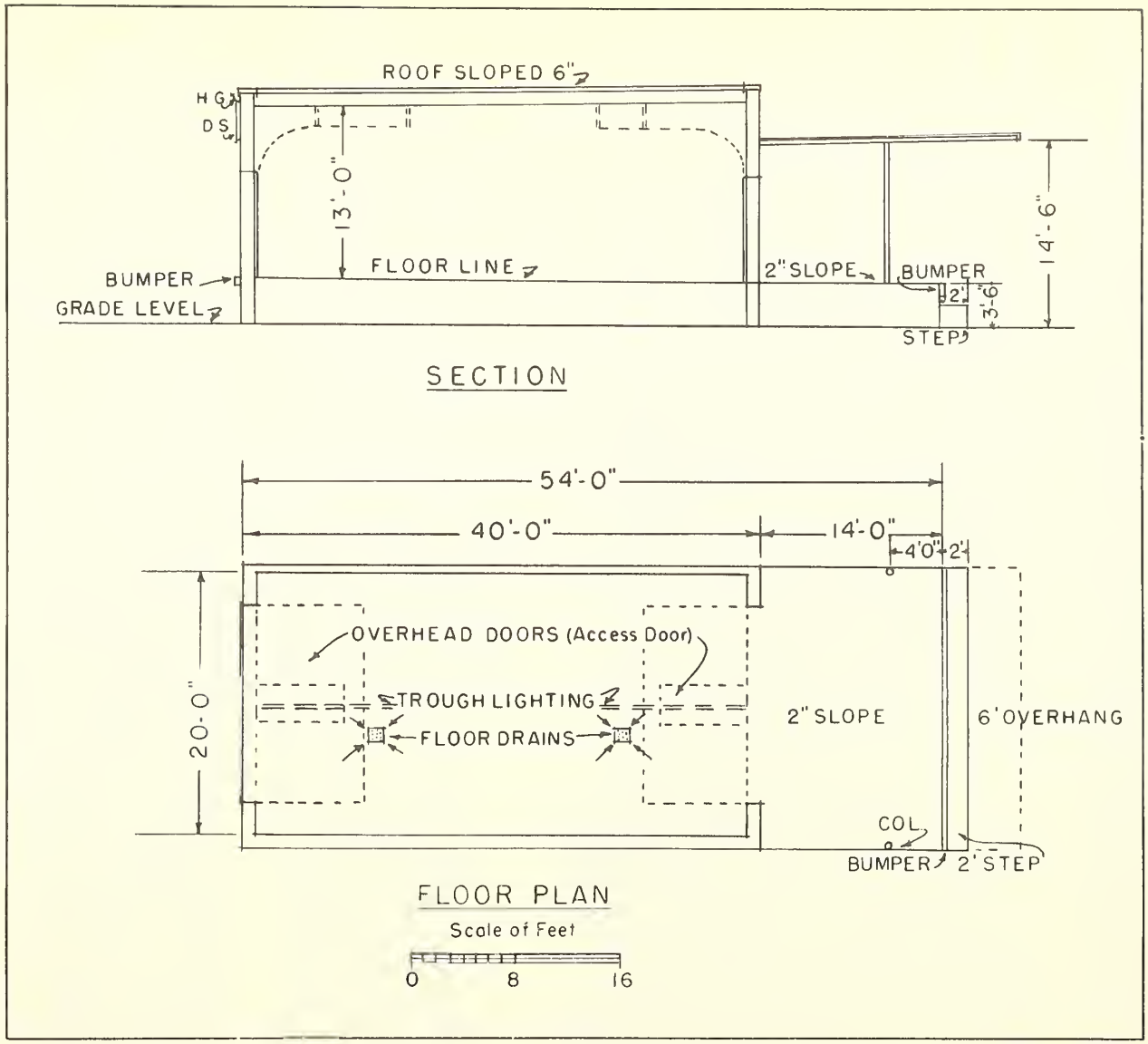

Figure 13.--Suggested plan for small multiple-store unit in Knoxville wholesale food center.

Container Shed

To serve dealers and growers on the market, a container shed with an area of 15,000 square feet was included in the plan. Although there are no container facilities in use at present, this area is suggested on the basis of the amount of space considered necessary for this size market. A container shed would be of special convenience to tomato repackers and other dealers doing substantial repacking by reducing the amount of space necessary for their operation. Such a facility also might aid in solving the problem of storing containers in and around store units.

Poultry and Eggs

Two general types of facilities are suggested for poultry wholesalers and processors. Ten multiple-store units in a building with fruit and vegetable wholesalers and one detached building for a large dealer are suggested.

Although requirements for poultry and egg dealers occupying multiple-store units differ from requirements of fruit and vegetable dealers, the units suggested are identical because of the relatively small number of units required. An additional advantage of identical multiple-store units would be that poultry and egg dealers could occupy more or less space than the 10 units provided for them. If poultry and egg stores were constructed to individual dealer's specifications, dealers would probably not be interested in front platforms over 14 feet wide.

Assuming that multiple-store units are built to the specifications previously discussed (25 feet wide, 60 feet deep, and 18 feet high, 24-foot front platform, 14-foot rear platform and 2 feet in front and rear walls), each unit would contain 1,500 square feet of first floor enclosed space, 375 square feet of mezzanine space, and 1,000 square feet of platform space for a total of 2,875 square feet per unit, or 28,750 square feet in the 10 units.

Because of different dealer requirements, each dealer should provide his own cooler and freezer space and special equipment for poultry dressing or handling so as to best meet his individual needs and the local regulations.

A single detached building containing 30,000 square feet of floor space is suggested for a poultry processor. The design and layout of this building would be the responsibility of the individual firm but should be built to meet all construction requirements of the U. S. Public Health Service, the Federal inspection service, State, city, and county sanitation departments, and city or county building codes, and should conform to the master plan of the market.7/

The building for the poultry processing operation included in the master plan would be 100 feet wide to conform to the depth of other buildings in the area, 300 feet long, and should have ceilings not under 18 feet high. The interior design and layout of the building would depend on the operations and preferences of the occupant at the time the building was constructed.

7/ For additional information on poultry plant construction see (1).

The total space planned for poultry and egg wholesalers is 1,014 square feet larger than they now occupy. This additional area would allow those dealers more adequate space for their operations. Space planned for poultry and egg wholesalers and processors is slightly less (1,282 square feet or 2 percent) than they presently utilize.

Meat and Meat Products

The operations of meat and meat products wholesalers would require 6 multiple-store units, 2 detached buildings for packer branch houses, and 3 detached facilities for slaughterers.

The operations of meat wholesalers in multiple units would differ from the operations of fruit and vegetable dealers and could probably best be conducted with certain modifications in the units. For instance, 14-foot front platforms would probably be adequate, but additional cooler and freezer facilities and a source of live steam would be desirable. However, because only 6 such units would be required at this time it is suggested that these units be built in the same design as the other multiple-store units. In this way interchangeability of types of food handlers could be achieved should the food wholesaling patterns change.

One exception in the meat stores would be the necessity of increasing the structural strength of the floor for support of meat rails. The actual installation of such rails, refrigeration facilities, and other equipment would be done by the individual dealers because operations would differ.

Assuming that these multiple stores are built to the same specifications previously discussed (25 feet wide, 60 feet deep, 18 feet high, 24-foot front platform, 14-foot rear platform and 2 feet in front and rear walls), each unit would contain 1,500 square feet first floor enclosed space, 375 square feet of mezzanine space, and 1,000 square feet of platform space, for a total of 2,875 square feet per unit or 17,250 square feet in the 6 units.

The design of two detached packer branch houses and facilities for the three meat slaughterers should be developed by the individual firms who will occupy them. However, these structures should conform to all codes and the master plan. Meat slaughtering general designs, adopted from those developed by the Texas Agricultural Experiment Station, have been included in the overall food center plan (4), for illustrative purposes.

Dry Groceries and Frozen Foods

Six separate buildings for dry grocery and frozen food dealers have been provided. One building would serve the two frozen food dealers and the remaining five would serve the dry grocery dealers.

Although it is recommended that two frozen-food dealers, for economies in construction cost, use the same building, the design of each dealer's section of the building would be determined by his particular operations; the only

restriction being the limiting features of the other part of the structure. The building shown in the master plan contains 39,750 square feet.

The five dry-grocery wholesalers, because of their individual requirements, should design the facilities they would require. These buildings should conform to all designs and codes of the master plan. Illustrative buildings were included in the plan, based on general space requirements of the dealers interviewed. These buildings would contain an aggregate of 130,000 square feet.

Food Chain Organizations

Space was provided in the master plan for the two food chain organizations presently maintaining warehouses in Knoxville and the two chain organizations with stores in the city but maintaining warehousing facilities elsewhere. The space requirements of each warehouse would vary. For illustrative purposes, buildings were based on the general space requirement of the food chain organizations contacted. These four buildings range from 12,500 square feet to 270,000 square feet and would contain a total of 360,000 square feet.

Refrigerated Warehouse

A refrigerated warehouse was included in the market plan because of the general desirability of such facilities. The size of this warehouse was based upon the one presently used and the probable requirements of the refrigerated warehouse. A warehouse should be designed to best meet the requirement of its individual operation. For illustrative purposes a structure containing 2,304,000 cubic feet was included in the master plan.

Rail Connections to Stores

Direct rail connections must be provided to each building occupied by dealers who receive food products by rail. The number of tracks needed will vary according to the volume of rail receipts. In the proposed plan double tracks are provided to the rear platform of all buildings.

The streets at the rear of the stores should be paved between and level with the top of the rails so that the rear platforms could be used in loading or unloading trucks when the tracks are not occupied by rail cars, and so that the areas would be easier to keep clean.

Streets and Parking Areas

The major streets in the food center should be paved to carry heavy traffic and to facilitate proper drainage away from the buildings. In developing these plans, we have assumed a paving consisting of a 7-inch rock or gravel foundation, 4 inches of macadam, and 2 inches of asphaltic concrete surface. All parking at the buildings should be at right angles to the loading platforms. Where two rows of buildings face the same street and center parking is planned, the streets

should be 160 to 190 feet wide to permit the parking of trucks at right angle on each side of the street, center parking, and sufficient space for the flow of traffic. Other streets may vary from 60 to 100 feet, depending on their use and the traffic load. For instance, in some cases it will be necessary to provide angle parking for cars and trucks, while in others only sufficient space to handle traffic will be needed.

Convenient parking spaces should be provided near the stores for vehicles that are not actually being loaded or unloaded. Such parking areas would be used for the parking of trucks bringing in supplies that are not ready to unload, buyers' cars and trucks coming to the food center for supplies that are not ready to load, and cars of employees in the food center. The parking areas should be as near the buildings as possible but should not block market streets or loading areas. They should be marked off to permit orderly parking and to conserve space. It is suggested that parking space for about 2,250 vehicles should be provided in addition to the spaces along store platforms.

Other Facilities and Services

In addition to facilities for the major food commodity wholesalers, certain other facilities would be necessary or desirable. The 20 offices would provide room for brokers, shippers' agents, a bank, a communication center, and other types of operations. Such office space could be built most economically on a second floor above multiple-store units. The actual number of offices constructed would depend upon requirements at the time of construction. Estimates here were based upon the present number of food brokers and the probable requirements of the various office occupants as previously enumerated.

Areas of a food center should also be allocated for wholesalers in related food businesses. Examination of present facilities of such wholesalers indicated that space might be used by a fluid milk-bottling plant, a canned-goods distributor, and others. Estimates of structural requirements for such facilities were not included in this report. An area of 21 acres was included for allied food industries.

In the proposed food center, a restaurant was included in one multiple-store unit of the fruit and vegetable section. Public restrooms could be provided most economically in a basement under the restaurant.

Space Recommended for Facilities

Space recommended for selected wholesale food handlers would be 80,000 square feet less than is presently utilized (table 13). Space suggested for poultry and egg wholesalers (those not processing), and for meat and meat products wholesalers and processors would be increased by 35,397 square feet, and space for other types of food handlers would be decreased by 116,067 square feet. These reductions do not include food chain organizations, refrigerated warehouse or office space.

Table 13.--Floor space in present facilities and in proposed wholesale food center, by type of facility, Knoxville

Type of facility	Floor space in present facilities	Floor space suggested for proposed food center	Difference from present space
	Square feet	Square feet 1/	Square feet
Fresh fruits and vegetables:			
Multiple-store units (large) for carlot receivers	105,565	57,500	-48,065
Multiple-store units (large) for commodity specialists	45,760	40,250	- 5,510
Multiple-store units (small) for trucker-jobbers	2/	22,400	2/
Stalls for growers and truckers	56,700	30,000	-26,700
Open-type stalls	3/	25,000	---
Container shed	3/	15,000	---
Poultry and eggs:			
Wholesalers	7,611	8,625	+ 1,014
Wholesalers and processors	51,407	4/ 50,125	-1,282
Meat and meat products:			
Wholesalers 5/	53,216	6/ 57,250	+4,034
Slaughterers	159,651	190,000	+30,349
Dry groceries and frozen foods	204,210	169,700	-34,510
Food chain organizations	7/	360,000	7/
Refrigerated warehouse	7/	120,000	7/
Office space above multiple units	2/	8/ 15,300	2/
Total	2/	2/1,161,150	-80,670

1/ Includes space on mezzanine and platforms.
2/ Not comparable because of different dealers involved.
3/ Type of facilities not presently used.
4/ Includes 20,125 sq. ft. in multiple-store units (large).
5/ Includes packer branch houses.
6/ Includes 17,250 sq. ft. in multiple-store units (large).
7/ Not comparable.
8/ Includes space in hallway.

Provision should be made in any wholesale food center for adequate expansion. This space should be included in the original master plan. In this study, expansion area has been included for each building, as well as for probable future allied food industries.

ARRANGEMENT OF FACILITIES IN A WHOLESALE FOOD DISTRIBUTION CENTER

In arranging the facilities of the various wholesalers on a given site, it is necessary to consider the basic objectives of commodity handling, which are:

1. Delivery of commodities to the facilities of a wholesaler in the original transportation units and without breaking bulk,

2. The most expeditious and economic grouping of commodities into the units desired by customers, and

3. Economical and sanitary movement of commodities to retailers and, ultimately, to consumers.

The designer of a wholesale food market, though primarily interested in the basic economic and functional objectives, should also consider various esthetic values.

Methods of achieving the economic and functional objectives include the factors of location (to be considered next) and design of the center. While it is realized that various modifications are necessary for specific sites, the basic principles of market design can best be illustrated by assuming a level, rectangular site. Such a design, as presented in figure 14, could readily be adapted to a wide range of sites. The scale model of a possible wholesale food center, as presented at a public meeting, may be seen in figure 15.

The layout in figure 14 illustrates one of many possibilities for food center development. This plan follows commodity groupings and segregates types of facilities. It promotes compactness but does not isolate any part. This type of development lends itself to sectional development along lines usually used in industrial parks. Expansion for each section as well as general expansion for allied industries is allowed for within the area. The types of buildings would be readily adaptable to changing functions within the food industry. Adequate rail spurs, parking, and roadways have been included.

The fresh fruit and vegetable section was placed near the main entrance to keep a large segment of market traffic as close to the entrance as possible. Multiple stores for poultry and egg dealers and for meat and meat product dealers were located near the fresh fruit and vegetable section because of the similarity in types of buildings, for convenience of buyers, and interchange of products. Office space on the second floor of one multiple-unit building was provided for market management, service facilities, and businesses dependent on the food industry. Trucker-jobber sheds, farmers stalls, and the container shed were located in a contiguous area because of interdependence of business.

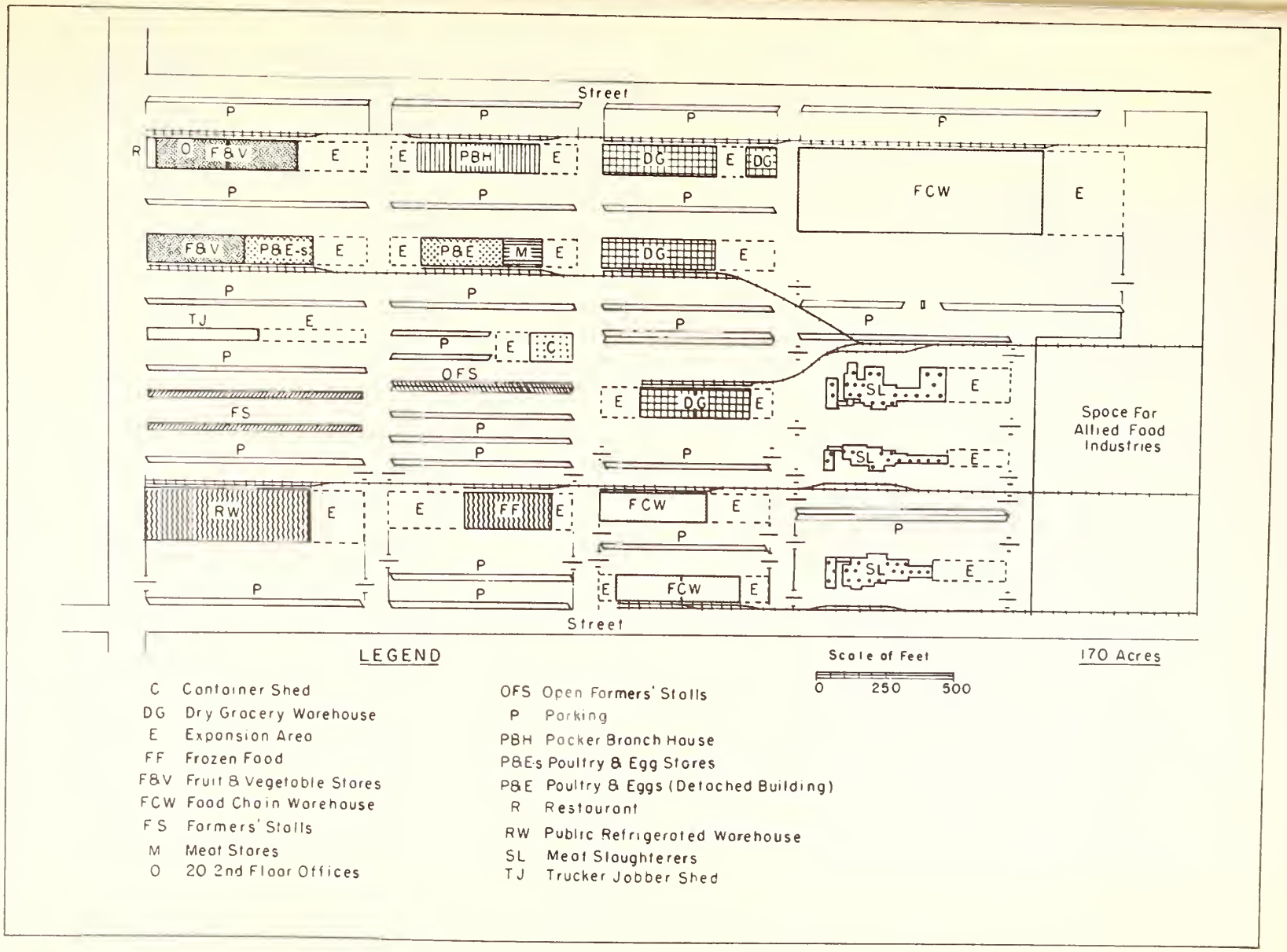

Figure 14.--Suggested arrangement of facilities for wholesale food center, Knoxville, Tenn.

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Figure 15.--Interested persons viewing a model of a wholesale food center for Knoxville at a public meeting at University Center, University of Tennessee, June 19, 1959.

The refrigerated warehouse and frozen food section was also located near the main entrance because these firms obtain substantial amounts of business from sources outside the food center. Dry grocery and food chain warehouses are located in a single area with access streets so traffic to these warehouses would not have to enter and leave the food center through other commodity areas. Slaughtering plants were located near the allied industry and away from strictly wholesaling areas because of the nature of their operations.

Provision should be made for rail tracks and parking areas in any food center plan. An area of 22 acres was included for allied food industries. A total of 170 acres would be adequate in Knoxville to provide for the needs of a complete wholesale food center and for the facilities enumerated in this report.

Future Needs

In developing plans for a food distribution center, both immediate and possible future needs should be considered. In the future, additional stores of the type originally constructed, or other types of facilities may be needed. While the primary function of this food center would be wholesaling food products, other types of suitable industry could be accommodated on additional acreage. These facilities could provide space for food shippers, transportation and general warehousing companies, food processing plants, equipment wholesalers, and other allied industries. Provision might also be made for a garage and truck service center, if such facilities were not already available near the site selected.

The experience of other cities that have built wholesale food centers indicates that many types of wholesalers and food handlers gravitate to the market area over a period of time. In addition, wholesalers initially on the market expand operations, or entire commodity areas may enlarge substantially.

SELECTING A SITE

During this study, numerous possible market sites were examined. Of these, 10 sites were considered which illustrate both the desirable and undesirable features typical of these and other sites. All sites, except two, could be developed for a market without the demolition of any substantial structures and all sites except parts of the Forest Avenue site would be in compliance with present land-use classifications of the Metropolitan Planning Commission. These 10 sites, expressway plans, major existing highways, railroads, and the center of distribution may be seen in figure 16.

The center of distribution was estimated by computing the geographical center of metropolitan Knoxville retail grocery stores and food chains, and adjusting this figure to compensate for out-of-metropolitan area volume. The center of distribution was located approximately at the intersection of 17th Street and the Frank Regas Expressway.

John Tarleton Institute Site

The John Tarleton Institute area (site 1), with surrounding property, would contain sufficient acreage for a complete food center, and is located inside the Knoxville city limits. The boundaries of the site considered are: North--Expressway and crest of ridge; east--Concord Street; south--Sutherland Avenue; and west--Liberty and Cox Streets.

This site has a 60-foot contour fall on one side. About 125 houses would have to be removed. The cost of the site, with 170 acres put in condition for building--including filling and grading, drainage, building demolition, and tree removal--was estimated to be about $9,200 per acre. The site is between one and two miles from the center of distribution and is located near the western leg of the new expressway system but is not now served by highways adequate for a food center. It could be served by both the Southern and Louisville & Nashville Railroads. Public utilities presently serve the area.

Forest Avenue Site

If a wholesale food center were to be constructed on the present Forest Avenue area (site 2), substantial additional acreage would be needed to attain the required 170 acres. It would be necessary to displace 375 residences, one hospital, a school, and a church. Although such measures cannot be advocated by this report, the approximate cost has been included for information.

In order to acquire the necessary land for expansion of this market area, it would be necessary to obtain the land within the following boundary lines:

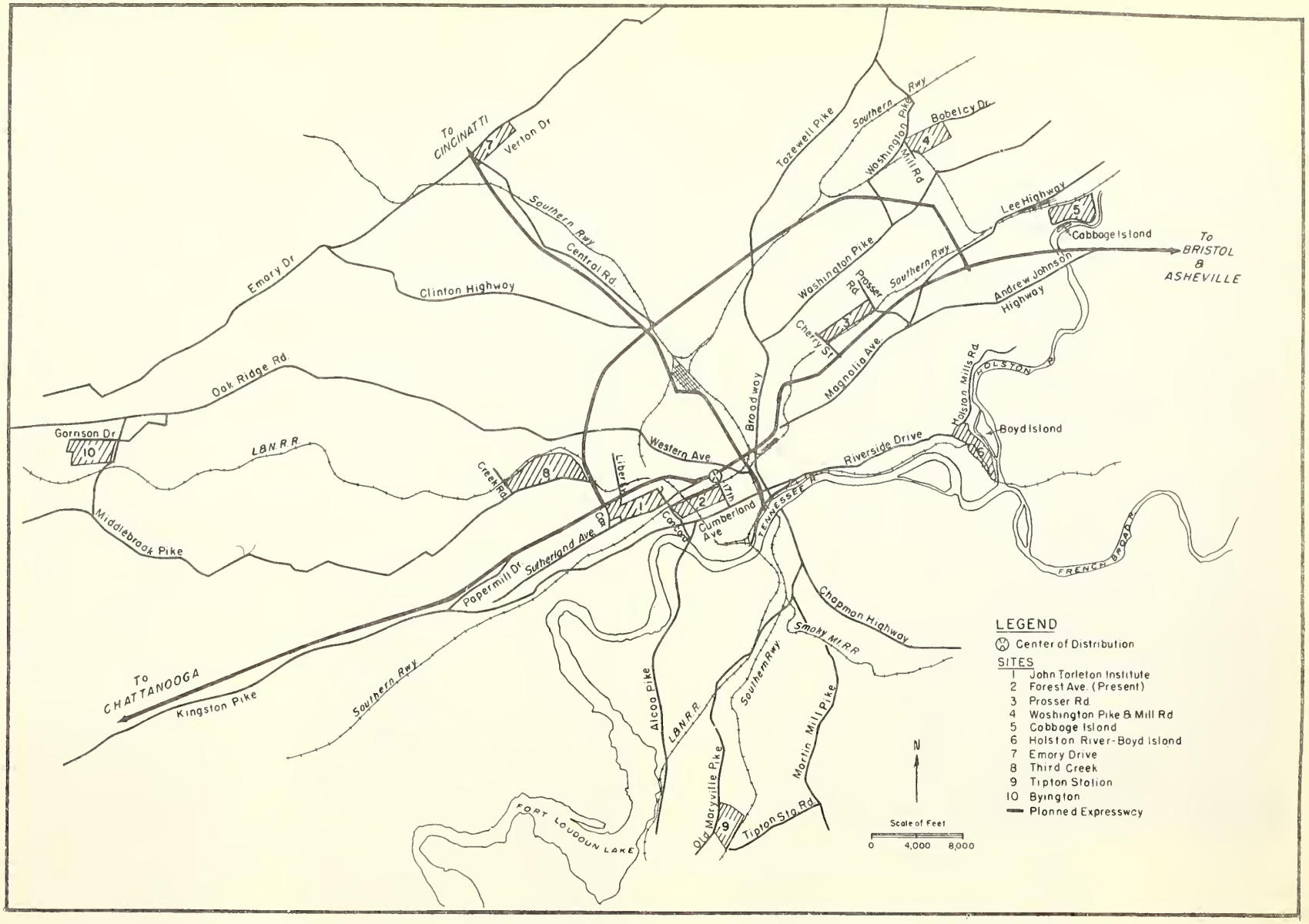

Figure 16.--Food center sites studied, Knoxville, Tenn.

North--Southern Railway; east--17th Street; south--Church Avenue; and west--Concord Street. This land is rough, with a 40-foot difference in contours. The cost of this site, including cost of land and present structures, removal of existing structures and trees, and filling and grading would be about $117,600 per acre or almost $10 million. It could be served by both the Louisville & Nashville and Southern railroads which maintain an interchange at this point. The site would be bisected by one of the expressway loops, is almost at the center of distribution, and is within the Knoxville city limits with utilities readily available. The use of the power of eminent domain would be necessary to acquire this site.

Prosser Road Site

The Prosser Road area (site 3), while located 3 to 4 miles from the center of distribution, is adjacent to the eastern leg of the proposed expressway system, and is located near Magnolia Avenue, a major traffic artery. This site, which has 170 acres available, could be served by the Southern Railway and is within the Knoxville city limits. The topography would necessitate substantial grading and fill. The area's boundaries are: North--almost to Cecil Avenue; east--Prosser Road and Carter Avenue (extended); south--the new expressway and Southern Railway; and west--Cherry Street. The cost of this site, including cost of the unimproved land, grading and filling, drainage and rerouting of streams, and removal of objectionable trees would be about $12,000 per acre. Public utilities are available.

Washington Pike and Mill Road Site

The Washington Pike and Mill Road area (site 4) in Knox County is 6 to 7 miles from the center of distribution. It will be less than a mile from the presently planned circumferential loop of the expressway system; however, present highways are inadequate to handle probable market traffic volume. Its boundaries are: North--Babelay Drive; east--powerline on Babelay Drive; south--a line 2,000 feet from Babelay Drive; and west--Mill Road. This site contains the required 170 acres, is relatively level (2 to 6 percent maximum slope), and is adjacent to the Southern Railway. Utilities are not available. Cost of this site, including real estate, sewage disposal, a private water system, filling and grading, drainage and rerouting of streams, and removal of buildings and objectionable trees would be under $11,000 per acre.

Cabbage Island Site

The Cabbage Island area (site 5) in Knox County has the advantage of being located adjacent to the Southern Railway's John Sevier yards on the north and is accessible by presently existing highways adequate to handle probable market traffic. It is bounded on the east and south by the Holston River and on the west by the western tip of Cabbage Island (extended). This area was subject to periodic flooding prior to TVA flood control. It is 9 miles from the center of distribution and would be a few miles from a planned expressway. Public utilities would not be available and the topography would require substantial filling

and grading. The site of 170 acres is located adjacent to a cement manufacturing plant from which odors and dust emanate that are objectionable to food marketing operations. The cost of the site, including the value of unimproved real estate, waste disposal, a private water system, filling and grading, and drainage would be under $4,000 per acre.

Holston River-Boyd Island Site

The Holston River-Boyd Island area (site 6) is located in Knox County 4 to 5 miles from the center of distribution. This site's boundaries are: North--Holston Mills Road; east--Boyd Island; south and west--Riverside Drive. It is not located with reasonable access to the planned expressway, and present roads are not adequate to handle the volume of traffic to and from a wholesale food center. Public utilities are not available and parts of this site were subject to periodic overflow prior to TVA flood control. In addition, the irregular shape of this site would offer certain problems to providing railroad access. Substantial filling and grading would be necessary because of the 5 to 10 percent slopes. The cost of 170 acres at the site, including unimproved real estate (but not including the cost of adequate access roads), waste disposal, a private water system, filling and grading, drainage, removal of buildings and objectionable trees, and relocation of streams is estimated to be about $2,500 per acre.

Airport at Emory Drive Site

The airport at Emory Drive area (site 7), in Knox County, although 9 miles from the center of distribution is adjacent to the planned interstate expressway system and was the most nearly level site considered; however, present highways serving the area would be inadequate for probable food-center traffic. Its boundaries are: North and east--Emory Drive; south--Verton Drive; and west--Central Avenue. This 170-acre site is almost a mile from existing Southern Railway tracks, necessitating new access trackage to the main line. Public utilities would have to be provided. The cost of this site, including the value of the property, a railroad spur, public utilities, a private water system, filling and grading, drainage, removal of buildings and objectionable trees, and rerouting of streams is estimated at almost $2,000 per acre.

Third Creek Site

The Third Creek area (site 8) in Knox County is located 2 to 3 miles from the center of distribution, but is immediately adjacent to the Knoxville city limits. It is located on a planned circumferential expressway and could be served by both the Southern and the Louisville & Nashville Railroads. Present highways are inadequate for probable food-center traffic. Its boundaries are: North and east--Louisville and Nashville Railroad; south--Middlebrook Pike; and west--Creek Road. The area is fairly level, is located near several petroleum tank farms, and contains sufficient acreage so that the food center could be developed on any one of several parts of the area. Public utilities would probably be available if suitable arrangements could be negotiated with the city of Knoxville since the city limits are only a few hundred feet from this site.

The cost of the site, including value of unimproved real estate, the extension of public utilities, filling and grading, drainage, removal of buildings and objectionable trees, and rerouting of streams would be about $3,000 per acre for 170 acres.

Tipton Station Site

The Tipton Station area (site 9), in Knox County, is located 6 miles from the center of distribution. This site is located on a Southern Railway branch and is not near any planned expressway although it is accessible at present by the Old Maryville Pike (a State highway). Its boundaries are: North--section line 316; south--Tipton Station Road; east--Southern Railway; and west--Old Maryville Pike. Its location south of Knoxville would necessitate the use of bridges over the Tennessee River to reach downtown Knoxville. This site has the advantage of fairly level topography (2 to 6 percent slope) and an adequate area (170 acres) available at a reasonable initial cost. Public utilities are not now available. The cost of this site, including unimproved value of real estate, waste disposal, a private water system, grading and filling, drainage, removal of buildings and objectionable trees would be about $2,100 an acre.

Byington Site

The Byington area (site 10) is located in Knox County about 10 miles from the Knoxville center of distribution. This location, about half way between Knoxville and Oak Ridge with close proximity to Clinton, might serve as a tri-city market. The boundaries of this site are: North--Garrison Drive; east--1,500 feet from Middlebrook Pike; south--Louisville & Nashville Railroad; and west--1,200 feet east of Byington-Solway Road. This level area is located on the Louisville & Nashville Railroad, and adequate land is available. This area has several possible sites. It is not located on any presently planned expressway but is served by the Oak Ridge Road. Public utilities are not presently available. Cost of the site, including the value of unimproved real estate, waste disposal, a private water system, filling and grading, drainage, removal of buildings and objectionable trees, and rerouting of streams would be approximately $2,500 per acre.

Sites Considered

Advantages and disadvantages for a number of areas which could be developed into a wholesale food center have been shown. These sites were selected from a larger number because they seemed to meet the primary requirements and were located in various parts of the city and county. Other desirable sites probably exist which were not evaluated, but they would be near one of the ten sites listed and might be similarly evaluated. Basic criteria considered included: Adequate land in a convenient shape, accessibility to railroads and highways, reasonable proximity to customers (center of distribution), and an economical price.

Of the sites considered, three probably more nearly meet the requirements than do the others. Therefore, sites No. 1 (John Tarleton Institute),

No. 3 (Prosser Avenue), and No. 8 (Third Creek) should merit especial consideration for development as a food center. Each of these three sites has adequate area in a convenient shape, each is or will be on or immediately adjacent to major traffic arteries, and the cost of each is estimated to be fairly reasonable. The dominant factor which sets these sites above the others, all other conditions being almost equal, is their nearness to the center of distribution.

Land Cost Basis

The cost of the sites was estimated by consulting several Knoxville real estate men. Such estimates, at best, are only rough approximations and, as pointed out, the sales price of any real estate cannot be determined until actual negotiations are undertaken.

As previously listed, the estimated values determined for the three preferred sites were: Site No. 1, $9,200 per acre, site No. 3, $12,000 per acre, and site No. 8, $3,000 per acre. From these values it is determined that the cost of 170 acres could vary between $510,000 and $2,040,000. Since it is not known which site will be selected, an average of the two highest valued sites (of the three)--$10,600 per acre--was used in the further development of this study. Should one of the other sites be chosen, a percentage increase or decrease should be applied to the land cost.

ESTIMATED INVESTMENT COST

The cost of a complete food center in Knoxville would involve two major components: (1) Land and (2) facilities. Considerable variation in each of these is possible, depending upon the location and construction of the facility.

Land

As previously discussed, the cost of land "in condition to build" would depend upon which site was chosen and could vary from a quarter of a million dollars to two million dollars. In estimating probable costs in this report a land cost of $10,600 per acre, or $1.8 million for 170 acres has been used. This value per acre represents the average cost per acre for two sites and is comparable to recent costs in Knoxville for developing land for light industry.

This estimate assumes land leveled, utilities available, and other necessary preparatory operations completed. The land would be ready for construction. The estimate does not include costs of paving streets, extending utilities, sewers, and other similar services to individual stores. After final selection of a site the actual value of the land could be used in a refined cost estimate.

Facilities

Facility costs are estimated on the basis of construction indexes as of February 1959, upon costs of similar facilities recently constructed, and upon estimates made by local contractors.

Floor space needed in the initial construction will depend not only on present needs but also on plans for development. Actual space used may differ considerably from these estimates when final plans for construction are completed. These estimates of space and facilities are based on analysis of present operations and current level of business, and on estimates of area business trends, as determined by this study.

It is assumed that individual firms would supply their own refrigeration (except the public refrigerated warehouse), light, power, heat, and special equipment. Exceptions are the cost of additional floor strengths, exterior wall insulation in certain instances, and the public refrigerated warehouse. Estimated construction costs are not intended to replace firm estimates made by local architects and contractors, and should be considered only as illustrative cost estimates.

Cost estimates are for structures of the type previously described (see the earlier section in which structures are discussed, page 34). The multiple-store units throughout the food center would be similar. They would not have finished offices (except the 20 offices on the second floor of the fruit and vegetable building), but they would include a mezzanine with stairway and railing, toilet facilities, sill cocks, fluorescent lighting fixtures, display lighting outlets, gas or electric space heaters, and platform lighting.

Detailed building cost estimates are for the shell only and do not include the various features individual dealers might include in the design. Cost estimates are based on "light mill" type construction.

Paved surface estimates for each section include the pro rata share of food center streets. Paving costs assume 7 inches of gravel or crushed rock foundation, 4 inches of macadam base, and 2 inches of asphaltic concrete surface.

Utility connections for all buildings, including electricity, were assumed to be underground. Other costs of construction, such as the architect's fee (6 percent), the construction loan (5 percent), and the contingency (10 percent) are the standard rates charged or included in construction.

The following sections list the cost estimates by type of building and by commodity handled in each type of structure. Unless otherwise specified, the facilities in each section would not differ from the general assumptions just presented.

The small multiple-store units would be similar in type of construction to the farmers' sheds except they would be larger, have platforms, be inclosed, and have certain features such as lights and garage-type doors. The 20 offices on the second floor of the one multiple-store building would be completely finished ready for occupancy, but would not include office equipment or furnishings. The unit in which the restaurant is located would have no special features, except that a mezzanine would not be included and public restrooms would be provided in the basement. The open-type farmers' stalls and the farmers' sheds would have no platforms but would have asphalt curbing to discourage the use of this area as a throughway.

1959 Estimated Investment Costs of Land and Facilities

Fresh fruits and Vegetables

Buildings and facilities:	
Buildings:	
Wholesale store units (large):	
20 units for carlot receivers in 1 building, @ $16,962--57,500 sq. ft., including mezzanines, @ $5.90 sq.ft.	$ 339,250
14 units for commodity specialists in 1 building, @ $16,962--40,250 sq.ft., including mezzanines,@ $5.90 sq.ft.	237,475
Wholesale store units (small)--20 units in 1 building, @ $6,160--22,400 sq. ft., @ $5.50 sq. ft.	123,200
Farmers' sheds--150 stalls in 2 buildings, @ $300 per stall--30,000 sq. ft., @ $1.50 sq. ft.	45,000
Open-type farmers' stalls--100 stalls @ $125 per stall--25,000 sq. ft. @ 50¢ sq. ft.	12,500
Container shed--15,000 sq. ft. in 1 building @ $3 sq. ft.	45,000
Second-floor offices--20 offices @ $6,120--15,300 sq. ft. (incl. hallways) @ $8 sq. ft.	122,400
Restaurant in multiple-store unit, with public restrooms in basement, 1 @ $19,500	19,500
Other facilities:	
Black-top combination paving--142,932 sq. yds., @ $3 sq. yd.	428,796
Trackage--2,050 linear ft., @ $10 ft.	20,500
Switches--2 @ $2,500 each	5,000
Sewers:	
Storm--2,250 ft. @ $3.50 ft.	7,875
Sanitary--1,500 ft. @ $1.90 ft.	2,850
Utility connections--6,000 ft. @ $5 ft.	30,000
Floodlights--18 @ $150 each	2,700
Public address system--1 @ $1,500	1,500
Fencing--2,250 linear ft. @ $3.50 ft.	7,875
Total construction costs	1,451,421
Other costs:	
Architect's fee--6% of construction costs	87,085
Construction loan--5% of construction costs and architect's fee	76,925
Contingency--10% of construction costs, fee, and loan	161,543
Total cost buildings and facilities	1,776,974
Land--33 acres @ $10,600	349,800
Total investment cost	2,126,774

Poultry and Egg Wholesalers and Processors

Multiple-store facilities:	
Multiple-store units (large)for wholesalers - 10 units in part of 1 building @ $16,962 - 28,750 sq.ft.(incl.mezzanines)@ $5.90 sq.ft.	$169,626
Blacktop combination paving - 17,141 sq.yds. @ $3 sq. yd.	51,423
Trackage - 565 linear ft. @ $10 ft.	5,650
Switch - 1 @ $2,500	2,500
Sewers:	
Storm - 315 ft. @ $3.50 ft.	1,102
Sanitary - 131 ft. @ $1.90 ft.	249
Utility connections - 761 ft. @ $5 ft.	3,805
Floodlights - 4 @ $150 each	600
Fencing - 262 linear ft. @ $3.50 ft.	917
Total construction costs	235,872
Architect's fee - 6% of construction costs	14,152
	250,024
Construction loan - 5% of construction costs and architect's fee	12,501
	262,525
Contingency - 10% of construction, fee, and loan	26,252
Cost of multiple facilities	288,777
Cost of land - 4.5 acres @ $10,600 acre	47,700
Cost of multiple facilities and land	336,477
Detached building facilities:	
Detached buildings for wholesalers and processors - 30,000 sq.ft. @ $6.65 sq. ft.	199,500
Blacktop combination paving - 14,090 sq.yds. @ $3 sq. yd.	42,270
Trackage - 635 linear ft. @ $10 ft.	6,350
Switch - 1 @ $2,500	2,500
Sewers:	
Storm - 285 ft. @ $3.50 ft.	998
Sanitary - 161 ft. @ $1.90 ft.	306
Utility connections - 689 ft. @ $5 ft.	3,445
Floodlights - 6 @ $150 each	900
Fencing - 238 linear ft. @ $3.50 ft.	833
Total construction costs	257,102
Architect's fee - 6% of construction costs	15,426
	272,528
Construction loan - 5% of construction cost and architect's fee	13,626
	286,154
Contingency - 10% of construction, fee, and loan	28,615
Cost of detached facilities	314,769
Cost of land - 3.6 acres @ $10,600 acre	38,160
Cost of detached facilities and land	352,929
Total cost of multiple-store and detached facilities	603,546
Total cost of land - 8.1 acres @ $10,600 acre	85,860
Grand total	689,406

Meat and Meat Product Wholesalers, Packer Branch Houses, and Slaughterers

Multiple-store facilities:	
Multiple store units (large) for meat wholesalers - 6 units @ $18,141 - 17,250 sq.ft.(incl.mezzanines and extra floor and platform strength and more floor drainage) @ $6.25 sq. ft.	$107,812
Blacktop combination paving - 12,176 sq.yds. @ $3 sq. yd.	36,528
Trackage - 625 linear ft. @ $10 ft.	6,250
Switch - 1 @ $2,500	2,500
Sewers:	
Storm - 300 ft. @ $3.50 ft.	1,050
Sanitary - 150 ft. @ $1.90 ft.	285
Utility connections - 750 ft. @ $5 ft.	3,750
Floodlights - 4 @ $150 each	600
Fencing - 100 linear ft. @ $3.50 ft.	350
Total construction costs	159,125
Architect's fee - 6% of construction costs	9,548
	168,673
Construction loan - 5% of construction costs and architect's fee	8,434
	177,107
Contingency - 10% of construction costs, fee and loan	17,711
Cost of multiple facilities	194,818
Cost of land - 2.9 acres @ $10,600 acre	30,740
Cost of multiple facilities and land	225,558
Detached building facilities:	
Detached buildings for packer branch houses and meat slaughterers - 5 buildings containing 230,000 sq.ft. @ $6.42	1,476,600
Holding pens for meat slaughterers - 30,000 sq.ft. @ $1.50	45,000
Cost of buildings and pens	1,521,600
Blacktop combination paving - 78,473 sq.yds. @ $3	235,419
Trackage - 4,000 linear ft. @ $10	40,000
Switches - 8 @ $2,500	20,000
Sewers:	
Storm - 2,850 ft. @ $3.50	9,975
Sanitary - 8,125 ft. @ $1.90	15,438
Utility connections - 13,825 ft. @ $5	69,125
Floodlights - 20 @ $150	3,000
Fencing - 5,650 ft. @ $3.50	19,775
Total construction costs	1,934,332
Architect's fee - 6% of construction costs	116,060
	2,050,392
Construction loan - 5% of construction cost and architect's fee	102,520
	2,152,912
Contingency - 10% of construction, fee and loan	215,291
Cost of detached facilities	2,368,203
Cost of land - 29.1 acres @ $10,600 acre	308,460
Cost of detached facilities and land	2,676,663
Total cost of multiple-store and detached facilities	2,563,021
Total cost of land - 32 acres	339,200
Grand Total	2,902,221

The cost estimates for multiple-store units do not include specialized meat handling equipment, but do include glazed tile walls, as well as heavier load-bearing capacity in floors and platforms to support meat rails. The detached structures for the slaughterers assume partially covered pens over concrete slabs and wooden pen partitions.

Dry Groceries and Frozen Foods

Detached building facilities:	
5 buildings for grocery wholesalers - 130,000 sq.ft.@ $6.08 sq.ft...	$ 790,400
1 building for frozen-food wholesalers - 39,700 sq.ft.@ $6.31 sq.ft.	250,507
Total building costs.....	1,040,907
Blacktop combination paving - 85,992 sq.yds. @ $3 sq. yd.....	257,976
Trackage - 5,050 linear ft. @ $10 ft.....	50,500
Switches - 7 @ $2,500 each.....	17,500
Sewers:	
Storm - 2,175 ft. @ $3.50 ft.....	7,612
Sanitary - 1,050 ft. @ $1.90 ft.....	1,995
Utility connections - 5,400 ft. @ $5 ft.....	27,000
Floodlights - 24 @ $150 each.....	3,600
Fencing - 2,700 linear ft. @ $3.50 ft.....	9,450
Total construction costs.....	1,416,540
Architect's fee - 6% of construction costs.....	84,992
	1,501,532
Construction loan - 5% of construction costs and architect's fee....	75,077
	1,576,609
Contingency - 10% of construction, fee and loan.....	157,661
Total cost of facilities.....	1,734,270
Total cost of land - 30.4 acres @ $10,600 acre.....	322,240
Grand total.....	2,056,510

The above cost of paving assumes that 2/3 of the area not covered by structures would be paved for parking and driving. The remainder, it is assumed, would be sodded.

Food Chain Warehouses

Detached building facilities:	
4 buildings - 360,000 sq.ft.@ $6.08 sq.ft.	$2,188,800
Blacktop combination paving - 74,771 sq.yds. @ $3 sq. yd.	224,313
Trackage - 2,435 linear ft. @ $10 ft.	24,350
Switches - 4 @ $2,500 each	10,000
Sewers:	
Storm - 1,100 ft. @ $3.50 ft.	3,850
Sanitary - 550 ft. @ $1.90 ft.	1,045
Utility connections - 2,750 ft. @ $5 each	13,750
Floodlights - 48 @ $150 each	7,200
Fencing - 3,250 linear ft. @ $3.50 ft.	11,375
Total construction costs	2,484,683
Architect's fee - 6% of construction costs	149,081
	2,633,764
Construction loan - 5% of construction costs and architect's fee	131,688
	2,765,452
Contingency - 10% of construction,fee and loan	276,545
Total cost of facilities	3,041,997
Total cost of land - 31.3 acres @ $10,600 acre	331,780
Grand total	3,373,777

The above cost of paving assumes that 2/3 of the area not covered by structures would be paved for parking and driving. The remainder, it is assumed, would be sodded.

Public Refrigerated Warehouse

Detached building facilities:	
1 building - 2,304,00 cu.ft.(120,00 sq.ft.) @ $1.25	$2,880,000
Blacktop combination paving - 31,607 sq.yds. @ $3	94,821
Trackage - 1,375 linear ft. @ $10	13,750
Switch - 1 @ $2,500	2,500
Sewers:	
Storm - 600 ft. @ $3.50	2,100
Sanitary - 300 ft. @ $1.90	570
Utility connections - 1,500 ft. @ $5	7,500
Floodlights - 14 @ $150	2,100
Fencing - 800 ft. @ $3.50	2,800
Construction costs	3,006,141
Architect's fee - 6% of construction costs	180,368
	3,186,509
Construction loan - 5% of construction cost and architect's fee	159,325
	3,345,834
Contingency - 10% of construction, fee and loan	334,583
Total cost of facilities	3,680,417
Total cost of land - 12.5 acres @ $10,600 acre	132,500
Grand total	3,812,917

Estimates for the cost of the public refrigerated warehouse assume costs for a structure which is completed, finished, and ready for operation. In this case,cos estimates include refrigeration equipment as well as special features indigenous to refrigerated warehouses.

Costs for paving include a pro rata share of public streets and assume that 2/3 of the area not covered by the building would be paved.

Allied Food Industries

22.7 acres reserved for allied food industries @ $10,600 acre.....$	240,620
Trackage to serve allied food industries - 2,175 linear ft.@ $10...	21,750
Sewers:	
Storm - 1,631 ft. @ $3.50 ft.....	5,708
Sanitary - 544 ft. @ $1.90 ft.....	1,034
Total cost.....	269,112

Trackage costs are included for this area because the tracks are located within the area and would be available for use by future occupants of the area.

Total Food Center Costs

Total cost of facilities in project.....$	13,428,717
Total cost of land in project.....	1,802,000
Grand total of entire project.....	15,230,717

OWNERSHIP AND MANAGEMENT OF A WHOLESALE FOOD CENTER

Types of Ownership

There are many ways to finance and operate a wholesale food center. Basic ways which have been used are: (1) Private corporations, (2) public benefit corporations, (3) direct public ownership, (4) cooperative associations or corporations, and (5) a combination of these ways.

Descriptions of these methods, adapted from a report on types of ownership and methods of financing, follow (2).

Private Corporations

A private corporation is not an agency or instrumentality of government. It is a legal entity, organized in conformity with existing State statutes, and made up of individuals bound together for a common purpose or objective. A private corporation usually is organized for profit, but may be operated as a nonprofit organization.

When a private corporation is operated for profit, there are usually no restrictions on the sale of voting stock to any individual because of his occupation or profession. Nor are there restrictions on the number of shares of voting stock that may be held by any one individual. Stockholders have one vote in corporate affairs for each share of voting stock held.

The primary advantage of corporate ownership is that the owners have a complete voice in operation, subject only to generalized legal restrictions. In addition, when the period of amortization expires, the entire investment belongs to the stockholders, tenancy changes would have no effect upon stock ownership,

and transfer of stock would be unrestricted. The major problem of corporate ownership of a food center corporation lies in the fact that a substantial financial equity is necessary.

When a private corporation is operated on a nonprofit basis, the sale of shares of voting stock usually is restricted. A nonprofit market corporation probably would restrict the sale of this stock to farmers, truckers, wholesalers, and others directly concerned with the operation of the market and would base the amount of stock sold to one individual or firm on the amount of facilities used. In some cases, eligible purchasers of voting stock also would be required to purchase a specified number of shares of nonvoting stock. Through these restrictions on stock sales the number of stockholders' votes and the voice in management exercised by any one shareholder is limited. Under the laws in some States, nonprofit corporations are variously referred to as cooperative corporations or as societies.

A number of wholesale markets are owned and operated by private corporations. In some instances the principal stockholders in these corporations are food wholesalers. In other cases, the corporation is a railroad company or some other firm which was organized primarily for other types of business. Most of the large terminal produce markets built in the 1920's were sponsored by railroad companies which believed that such markets would increase the volume handled by their lines.

Public Benefit Corporation

Market authorities are usually organized as public benefit corporations. This type of organization offers a number of desirable features not found in some other types of ownership and differs from nonprofit private corporations only in that public benefit corporations are usually publicly owned.

Features offered by public benefit corporations include: A public benefit corporation is a nonprofit agency. As such, rentals and other charges do not exceed the amount needed to pay the costs of operation, amortize the original investment, and maintain a limited reserve for contingencies. Because under public ownership the revenues obtained would be considered as public funds, the reserve funds could not be paid to lessees as dividends. However, there is the possibility that reserves of funds might be appropriated for other public uses while bonds remain outstanding unless such reserves are specifically committed to redemption of outstanding bonds. Market authorities usually have the power of eminent domain which can be useful in the acquisition of a site. Such corporations usually finance market improvements through the sale of revenue bonds. This type of financing usually is not a full faith and credit obligation of a State or a political subdivision. These revenue bonds are usually tax exempt thereby lowering the interest cost. However, even if this is not the case the bonds of a State or political subdivision usually have such established credit ratings that the sale of the bonds at favorable rates is possible. A public agency, such as a market authority, is more likely than some types of private ownership to provide for future expansion and to work toward the establishment of a complete wholesale food center. A market authority may or may not be required to pay taxes to the community in which it is located.

Market authorities also have certain limitations, especially with respect to the financing and management of the facilities. For example: One of their most serious limitations is their inability to raise funds for capital improvements, except through the sale of revenue bonds. To overcome this limitation, some State or city governments have appropriated part of the funds needed for land acquisition and original construction. As a rule, a market authority must have either equity funds or State (or city) responsibility for its loans. The continuity of management on some markets has been dependent on the continuance of a State or municipal government administration in office. As a whole, market authorities do not have as complete freedom of operation as is possible under private ownership.

Direct Public Ownership

A number of wholesale food market facilities have been financed, constructed and operated by States, counties, or municipalities. Several States and a number of municipalities have enabling legislation covering the improvement or establishment of produce markets.

Direct State ownership and operation of a wholesale market facility usually can be differentiated from ownership and operation by a State market authority by the methods of financing used and the delegation of authority made by the State legislature. Although a number of States have appropriated funds for and otherwise assisted market authorities with financial problems, they do not usually underwrite the total cost of a market constructed by an authority. Nor have the States assumed responsibility for the operation of these markets after they were constructed. Direct State ownership contemplates that a market facility will be financed in whole or in greater part by an appropriation of State funds. If not financed in its entirety by this method, the State usually is obligated for the remainder unless this balance is obtained through grants or donations. Also, the State is responsible for maintenance and other expenses involved in the operation of a State-owned market.

Municipal or county ownership of a wholesale produce market is comparable in many of its basic aspects to direct State ownership. A number of municipalities are authorized in their charters to construct and operate food markets. However, in some cases, city councils or commissions are not authorized to make appropriations from general funds in the city treasury for the construction of market facilities on a basis comparable to that of a State legislative body. Three methods are usually open to municipalities for financing a market program: (1) Issuance of municipal bonds, (2) issuance of revenue warrants, and (3) loans from public corporations. In most cities the issuance of bonds for such purposes must be approved by a majority of the qualified electorate voting in a referendum. States usually finance, construct, and operate wholesale produce market facilities because legislative bodies feel that improved facilities will, in themselves, serve the public interest.

Facilities constructed with municipal or county funds would necessarily be owned by the county or municipality and rent would have to be paid by the tenants indefinitely.

Farmer Cooperatives

A farmer cooperative is a business organization, which operates for the mutual benefit of its members or stockholders as producers or patrons. It is usually incorporated, owned, and controlled by member agricultural producers. The association is operated on a cost basis, after allowing for the expenses of operation and maintenance, for any other authorized deductions for expansion, and for a necessary reserve. In a cooperative, the financial benefits accrue to its clients, whereas in a commercial enterprise such benefits accrue to those who have invested their money in the business and have bought stock. In the marketing of farm and food products and the purchasing of supplies, cooperatives usually own and operate such facilities as they deem necessary. Cooperatives, in theory, are extensions of the firms or individuals they serve.

Agricultural cooperatives, which comply with rather rigid requirements, are accorded special treatment under the Federal income tax laws. In some States farmer cooperatives are exempt from payment of State income tax. However, cooperatives pay property taxes and other taxes paid by businesses, as required by law.

Combinations

Wholesale food markets have been established combining two or more of the methods previously discussed. For example, in Philadelphia a food center has recently been built by a nonprofit private corporation on land owned and put in condition for building by the city.

In Knoxville, it would be possible to use two or more of these methods to finance a food center. The entire food center could be constructed and operated by a single agency, or various parts could be constructed and operated by different agencies, or construction and operation could be by different agencies. To illustrate: The farmers' stall area could be constructed and operated by cooperative or county ownership, while multiple-store units could be constructed and operated by some other combination.

REVENUE REQUIRED AND SOURCE OF REVENUE

Revenue required could vary according to the methods used to finance a food center. For example: State ownership could not only reduce interest costs, but could also materially affect the amortization period. If a corporation were constructing its own facilities, one with substantial assets, obviously, could effect better financing arrangements than could one with limited assets. It is not feasible in this report to illustrate all possibilities, and therefore, it was necessary to make certain assumptions.

For purposes of this study, it has been assumed that if a food center were built containing the suggested facilities, it might follow the general layout as presented in figure 14. For simplicity, it was assumed that the entire wholesale food center would be constructed by a single private agency and leased for long periods to the occupants. Direct supervision of operations would be provided only for multiple-unit facilities. Such assumptions are not intended to suggest the most desirable arrangements, nor are they intended to exclude other arrangements but, rather, they are presented so that some estimate of probable operating expenses may be included in this report.

For purposes of this report revenue requirements will be considered under three different categories: (1) Cost of management and upkeep, (2) taxes on real estate, and (3) debt service.

Cost of Management and Upkeep

The operating expenses for the food center would consist of 5 categories: (1) Management expenses, (2) sanitation costs, (3) fire and liability insurance, (4) maintenance and repair, and (5) reserve or contingency fund. Management expenses would consist of salaries for the management staff, fees for special services, office rent, travel and per diem, advertising and promotion, office supplies and equipment, telephone and telegraph, and utilities. Sanitation costs would include janitor services for the offices, garbage removal, and general market sanitation.

Management expenses and sanitation costs are based upon estimates of what they would probably cost in Knoxville and comparative costs in other markets. Management and sanitation expenses are as follows:

Management Expenses

Manager	$ 10,000
Assistant manager	5,000
Secretary-clerk	3,600
Gateman-watchman	3,600
Legal, auditing, and other special services	3,000
Office rental allowance	1,800
Travel and per diem	1,200
Advertising and promotion	1,500
Office supplies and equipment	2,000
Telephone and telegraph	1,000
Utilities	2,000
Miscellaneous expenses	5,300
Total management expenses	40,000

Sanitation Costs

Janitor services for offices	$ 3,000
Garbage removal	5,000
General market sanitation	10,000
Miscellaneous expenses	2,000
Total sanitation expenses	20,000

The other management costs, insurance, and maintenance and repair were based upon construction costs. Fire and liability insurance was based on those rates for fire, extended coverage, and public liability which would most probably apply to structures considered. The rates supplied by local insurance agents were $0.22 per $100 valuation for 80 percent of the facility cost for fire and extended coverage, and $1.75 per $1,000 for public liability coverage. For purposes of this report, it was assumed that each commodity section would have public liability insurance up to $500,000. The total annual cost of insurance for the food center would be $31,582. Maintenance and repairs were assumed to be 1/2 of 1 percent of facility costs and would amount to $74,808. A reserve or contingency fund of 10 percent was included in these costs to allow for variations. This fund would be about $16,640 per year. The total estimated annual income needed for operation of the proposed wholesale food center would be about $183,030.

The lump sum costs have been allocated so they would apply to the entire food center. These costs have been prorated or allocated to the various groups considered. While the primary means of prorating was based on the relative value of facilities an adjustment was made to compensate for the fact that multiple-store facilities and farmers' stalls would take more of the management staff's time. The lump sum costs, as well as other costs of management and upkeep, by commodity group, may be seen in table 14.

Real Estate Taxes

The food center development management will pay taxes on land, buildings,and other taxable facilities on the basis of the current tax rate and the assessed valuation of the property in the city of Knoxville or Knox County, in whichever the food center is located. For purposes of this report, the 1958 city of Knoxville tax rate, $2.85 per $100 of assessed valuation is used. According to local officials, the assessed valuation would probably be about 50 percent of the current value -- current value being assumed to be the same as the investment. To allow for changes in the tax rate, a reserve of 10 percent is included. This reserve could probably be discontinued when it amounted to a full year's tax payment. For the entire food center, having an assessed valuation of $7.4 million, the taxes and reserve would amount to $234,523. Taxes and reserve on the fresh fruit and vegetable section would be $33,338; on the

Table 14.--Estimated annual cost of management and upkeep in the proposed wholesale food center, Knoxville

Food groups	Management expenses 1/	Sanitation costs 1/	Fire, extended coverage and liability insurance 2/	Maintenance and repairs 3/	Reserve or contingency 4/	Total
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Fresh fruits and vegetables:						
Wholesale store units:						
Large, for carlot receivers and commodity specialists	3,280	1,640	2,832	6,518	1,427	15,697
Small	680	340	605	1,393	302	3,320
Farmers' sheds	240	120	226	521	111	1,218
Open-type farmers' stalls	80	40	55	128	30	333
Container shed	240	120	226	521	111	1,218
Offices	680	340	605	1,393	302	3,320
Restaurant and public restrooms	120	60	69	160	41	450
	5,320	2,660	4,618	10,634	2,324	25,556
Poultry and egg wholesalers and poultry processors:						
Multiple store units	800	400	1,052	1,737	399	4,388
Detached building	800	400	1,036	1,710	395	4,341
	1,600	800	2,088	3,447	794	8,729
Meat and meat products:						
Multiple-store units	520	260	412	1,001	219	2,412
Detached buildings	6,920	3,460	5,571	13,510	2,946	32,407
	7,440	3,720	5,983	14,511	3,165	34,819
Dry groceries and frozen foods	4,960	2,480	4,494	10,282	2,222	24,438
Food chain warehouses	8,920	4,460	6,813	16,869	3,706	40,768
Public refrigerated warehouse	11,760	5,880	7,586	19,065	4,429	48,720
Total	40,000	20,000	31,582	74,808	16,640	183,030

1/ Assuming pro rata share of food center management cost.

2/ Assuming $0.22 per $100 for 80% of facility cost for fire and extended coverage and $8.75 per year for each commodity section for public liability insurance up to $500,000.

3/ Assuming one-half of one percent of the building construction costs, paving, and utility connections.

4/ Estimated at 10 percent of management expenses, sanitation cost, fire and liability insurance, and maintenance and repairs.

poultry and egg wholesalers and poultry processors $10,806; on meat and meat products $45,493; on dry groceries and frozen food $32,235; on food chain warehouses $52,884; and on the public refrigerated warehouse $59,767. Table 15 shows the probable taxes, including reserve, that would be paid on the proposed food center.

Income Required for Debt Service

The third major group of costs which must be paid by a food distribution center is debt service. The proportion of the total that might be borrowed on mortgage loan and the terms of the loan will depend to some extent on the money market. Facilities of the type described should not become obsolete in less than 20 to 30 years and very likely will be useful over a longer period. Such facilities are of desirable construction and with only minor alterations can be converted for use by many types of occupants.

The money required would probably be obtained from three sources: (1) First mortgage bonds, (2) a second mortgage or preferred stock, and (3) equity capital. Depending upon the money market at the time the money is borrowed, various amounts could be obtained from each of these sources. In general, about 65 percent might be obtained on a first mortgage and 20 to 25 percent on a second mortgage or by issuance of preferred stock. The remaining 10 to 15 percent would be needed as equity capital. For purposes of this report, a rate of 6 percent amortized over 25 years was assumed. This rate would be a composite of the varying rates charged for capital from each of the sources. If the first mortgage were obtained for $5\frac{1}{2}$ percent, the second mortgage for $6\frac{1}{2}$ percent, the equity capital having a value of 7 percent, then the average interest rate would be about 6 percent. If the equity capital were supplied by tenants in proportion to relative cost of the facility, it is probable, because of the tax situation, that there would be no payment of dividends to stockholders. Under this assumption, of course, the 6 percent interest rate might be higher than the actual cost of borrowing the money.

If bonds were issued, financiers and persons purchasing the bonds would probably demand that current income exceed current expenses by some stipulated amount and that this amount remain in a reserve fund. Amounts required would vary according to the "tightness" of the money market, the financial rating of the bond issuer, and the nature of the collateral offered. Such a reserve fund should usually amount to about 20 percent of the annual costs and should be continued until a full year's amortization payment is in reserve. Therefore, a 20 percent reserve or contingency allowance was made in these computations.

Until a financial plan is worked out, the terms of the loan cannot be known. However, for the purpose of determining the amount of rental on the various facilities, the rate of 6 percent for 25 years, as mentioned, is used. Table 16 shows the estimated annual income required for debt service, by food groups, to amortize the cost of the food center. Should the city, county, State, or other agency lend its credit or tax exempt status, interest rates might be reduced.

Table 15.--Estimated real estate taxes to be paid on proposed wholesale food center, Knoxville

Food group	Assessed valuation 1/	Tax 2/	Reserve 3/	Total
	Dollars	Dollars	Dollars	Dollars
Fresh fruits and vegetables:				
Wholesale store units:				
Large, for carlot receivers and commodity specialists..	651,857	18,578	1,859	20,437
Small.....	139,304	3,970	397	4,367
Farmers' sheds.....	52,106	1,485	148	1,633
Open-type farmers' stalls..	12,760	364	36	400
Container shed.....	52,106	1,485	148	1,633
Offices.....	139,304	3,970	397	4,367
Restaurant and public rest-room.....	15,951	455	46	501
Total.....	1,063,388	30,307	3,031	33,338
Poultry and egg wholesalers and poultry processors:				
Multiple-store units.....	173,730	4,951	495	5,446
Detached buildings.....	170,973	4,873	487	5,360
Total.....	344,703	9,824	982	10,806
Meat and meat products:				
Multiple-store units.....	100,126	2,854	285	3,139
Detached buildings.....	1,350,984	38,503	3,851	42,354
Total.....	1,451,110	41,357	4,136	45,493
Dry groceries and frozen food:..	1,028,255	29,305	2,930	32,235
Food chain warehouses.....	1,686,888	48,076	4,808	52,884
Public refrigerated warehouse.	1,906,458	54,334	5,433	59,767
Total.....	7,480,802	213,203	21,320	234,523

1/ Assessed value assumed to be 50 percent of construction cost.
2/ Assuming 1958 city of Knoxville tax rate of $2.85 per $100 of assessed valuation.
3/ Computed at 10 percent of taxes.

Table 16.--Estimated annual cost for debt service in the proposed wholesale food center, Knoxville

Food group	Investment in land and buildings	Amortization charge 1/	Reserve or contingency 2/	Total
	Dollars	Dollars	Dollars	Dollars
Fresh fruits and vegetables:				
Wholesale store units:				
Large, for carlot receivers and commodity specialists	1,303,713	101,991	20,399	122,390
Small	278,607	21,795	4,359	26,154
Farmers' sheds	104,212	8,152	1,630	9,782
Open-type farmers' stalls	25,521	1,996	399	2,395
Container shed	104,212	8,152	1,630	9,782
Offices	278,607	21,795	4,359	26,154
Restaurant and public restrooms	31,902	2,496	499	2,995
Total	2,126,774	166,377	33,275	199,652
Poultry and egg wholesalers and poultry processors:				
Multiple-store units	347,461	27,182	5,436	32,618
Detached buildings	341,945	26,750	5,350	32,100
Total	689,406	53,932	10,786	64,718
Meat and meat products:				
Multiple-store units	200,253	15,666	3,133	18,799
Detached buildings	2,701,968	211,375	42,275	253,650
Total	2,902,221	227,041	45,408	272,449
Dry groceries and frozen food	2,056,510	160,881	32,176	193,057
Food chain warehouses	3,373,777	263,930	52,786	316,716
Public refrigerated warehouse	3,812,917	298,283	59,657	357,940
Total	3/ 14,961,605	1,170,444	234,088	1,404,532

1/ Assuming 6% annual interest rate amortized over 25 years.
2/ Computed at 20% of the annual amortization charge.
3/ Does not include allied food industries area.

Total Annual Income Required

Estimates of the amount of revenue needed to operate the food center, including costs of management and upkeep, taxes, and debt service, are shown in table 17. Costs of operation for the individual businesses occupying these facilities are not included. The total amount needed to operate the food center would be about $1,822,085.

Costs of operating, owning, and managing various sections of the food center would be approximately as follows:

Fresh fruits and vegetables	$258,546
Poultry and eggs	84,253
Meat and meat products	352,761
Dry groceries and frozen foods	249,730
Food chain warehouses	410,368
Public refrigerated warehouse	466,427
	1,822,085

These costs would be decreased by 1.6 percent if site No. 1, John Tarleton Institute, was chosen; increased 1.2 percent if site No. 3, Prosser Avenue, was chosen; and decreased by 7.8 percent if site No. 8, Third Creek, was chosen. Similar computations could be made for other sites.

Source of Revenue

Food centers may have several sources of revenue. The primary source in most markets is the rent from the various store units and facilities. However, in addition to this source, some markets obtain revenue by charging fees to incoming trucks and charging such services as restaurants and truck service stations a percentage of their gross. There are certain other minor sources of income, such as revenues from vending machines and public telephones.

For purposes of this report, the source of revenue assumed for the food center would be from rents charged for the facilities. As previously mentioned, rents could be materially affected by the methods used to finance and operate the market. However, it was assumed that private financing and operation would be used.

Rental charges per unit and per square foot are based on total computed costs (table 18). From a practical viewpoint, in an actual situation, it would probably be necessary to charge similar amounts for similar facilities. Computed rents differ for similar facilities because of different expansion areas and different proportions of public streets and management costs. Rentals presented are only sufficient to cover costs and reserves.

If procedures used in other markets were followed, certain reductions in operating costs might be achieved. In some markets, governmental agencies have assumed such cost items as street cleaning and garbage removal, utility companies have assumed the cost of supplying service to the individual stores, and railroads have constructed lead-in and team tracks. If such agencies and companies could be interested in providing like services in Knoxville, the cost of operation could, of course, be reduced.

Table 17.--Estimated total annual cost for operating the proposed wholesale food center, Knoxville

Food group	Management and upkeep	Real estate taxes	Debt service	Total
	Dollars	Dollars	Dollars	Dollars
Fresh fruits and vegetables:				
Wholesale store units:				
Large, for carlot receivers and commodity specialists	15,697	20,437	122,390	158,524
Small	3,320	4,367	26,154	33,841
Farmers' sheds	1,218	1,633	9,782	12,633
Open-type farmers' stalls	333	400	2,395	3,128
Container shed	1,218	1,633	9,782	12,633
Offices	3,320	4,367	26,154	33,841
Restaurant and public rest-rooms	450	501	2,995	3,946
Total	25,556	33,338	199,652	258,546
Poultry and egg wholesalers and poultry processors:				
Multiple-store units	4,388	5,446	32,618	42,452
Detached building	4,341	5,360	32,100	41,801
Total	8,729	10,806	64,718	84,253
Meat and meat products:				
Multiple-store units	2,412	3,139	18,799	24,350
Detached buildings	32,407	42,354	253,650	328,411
Total	34,819	45,493	272,449	352,761
Dry groceries and frozen food	24,438	32,235	193,057	249,730
Food chain warehouses	40,768	52,884	316,716	410,368
Public refrigerated warehouse	48,720	59,767	357,940	466,427
Total	183,030	234,523	1,404,532	1,822,085

Table 18.--Estimated annual charges required for specified facilities in the proposed wholesale food center, Knoxville

Type of facility	Units planned	Total space planned	Cost of operation	Annual revenue required: Per unit 1/	Annual revenue required: Per square foot
	Number	Square feet	Dollars	Dollars	Dollars
Fresh fruits and vegetables:					
Wholesale store units:					
Large for carlot receivers and commodity specialists	34	97,750	158,524	4,662	1.62
Small	20	22,400	33,841	1,692	1.51
Farmers' sheds	150	30,000	12,633	84	0.42
Open-type farmers' stalls	100	25,000	3,128	31	0.13
Container shed	1	15,000	12,633	---	0.84
Offices	20	15,300	33,841	1,692	2.21
Restaurant and public restrooms	1	2,150	3,946	---	1.84
Total	--	207,600	258,546	---	---
Poultry and egg wholesalers and poultry processors:					
Multiple-store units	10	28,750	42,452	4,245	1.48
Detached building	1	30,000	41,801	---	1.39
Total	--	58,750	84,253	---	1.43
Meat and meat products:					
Multiple-store units	6	17,250	24,350	4,058	1.41
Detached buildings	5	230,000	328,411	---	1.43
Total	--	247,250	352,761	---	1.43
Dry groceries and frozen foods	6	169,700	249,730	---	1.47
Food chain warehouses	4	360,000	410,363	---	1.14
Public refrigerated warehouse	1	120,000	466,427	---	3.89
Total	--	2/1,163,300	1,822,085	---	---

1/ Computed for multiple units only.

2/ Total differs from that of table 13 because of the additional 15,300 square feet in offices and 2,250 square feet in the restaurant and public restrooms.

ESTIMATED BENEFITS AND COST REDUCTIONS

Measurable Benefits and Cost Reductions

Certain marketing costs which would be affected most by improved facilities have been estimated for various food wholesalers in Knoxville. These were for (1) cartage, (2) handling, (3) interdealer movement, (4) spoilage, deterioration, breakage, and shrinkage, and (5) rentals. Although these are not the only marketing costs, they represent the major sources of savings or cost change which would be effected in proposed new facilities. The costs of operation in present facilities were compared with the expected cost of operation in the recommended new types of facilities.

Cartage

Cartage is the cost incurred in loading and moving products from team tracks or point of initial receipt to the dealer's store. The new facilities recommended in this report provide rail connections for each store; these would reduce the amount of cartage necessary.

Since most railcars would arrive directly at the dealer's store, there would be a cost for unloading. This unloading cost was included not in the cartage cost but in the handling cost for both present and proposed facilities.

Although reduced substantially, some cartage costs would continue for dry grocery and frozen food handlers--principally public-warehouse receipts. These costs would remain about the same for food chain organizations. Cartage costs for other dealers would probably continue for "pool cars," or cars which several dealers share. Such pool cars could be unloaded from the second track provided behind the store units. Potential savings in cartage costs by commodity may be seen in table 19; total cartage costs could probably be reduced by $18,339.

Table 19.--Cartage costs in present facilities in 1958 and in proposed wholesale food center, Knoxville

Commodity group	Carlots incurring cost		Cost per carlot	Total cost		Cost reduction
	Present	Proposed		Present	Proposed	
	Number	Number	Dollars	Dollars	Dollars	Dollars
Fruits and vegetables	410	50	29.49	12,090	1,474	10,616
Dry groceries	269	25	31.65	8,514	791	7,723
Food chain organizations	41	41	30.27	1,241	1,241	0
Total or average....	720	116	30.34	21,845	3,516	18,339

Handling

One of the largest areas of savings available from operating in new improved facilities would be from increased labor efficiency. The recommended facilities provide for handling commodities in one-story buildings adapted for the use of modern handling equipment with platforms at railcar level at the rear and at truckbed level at the front. Commodities would be received at the dealer's store at the rear platform from either truck or railcar.

One of the best ways to reduce costs is to use pallets to handle merchandise, and to use full pallet loads as much as possible. Facilities such as those recommended here are designed to take full advantage of this principle. Those commodities received in boxes or cartons could be loaded on skids or pallets in a car or truck or on the platform and moved into the store. Bulk products could be loaded on efficient handling equipment and transported to the display area, coolers, or platforms. Even without such equipment, large savings would accrue because of improved operations and facilities. The cost reductions in this area have been classified as handling costs, which include flow of commodities through a facility from unloading to loading on outbound trucks.

Computation of cost reductions possible because of improved facilities were largely based on costs discovered through research. Supplementing research, percentage cost reductions of dealers in other markets who have moved to new facilities were also considered. Probable reductions in handling costs shown in table 20 amount to $625,699.

Interdealer Movement

Another area of cost which would show considerable percentage reduction in an efficient wholesale food center would be the interdealer movement costs. These costs, although necessary, are especially high where there are scattered dealer facilities and a split market. In the proposed wholesale food center, facilities are reasonably accessible to other dealers and are located in a more compact area than in the present operations. This should result in some savings in these marketing costs. These estimated savings amount to $13,517 (table 21).

Reductions in interdealer movement were based upon the assumption that the same volumes would be moved over shorter distances. In the proposed food center, much interdealer movement could be effected by simply forklifting down a platform.

Spoilage, Deterioration, Breakage, and Shrinkage

Costs for spoilage, deterioration, breakage, and shrinkage should be substantially reduced in a wholesale food center because it would no longer be necessary to store perishable commodities outside. Pilferage would be reduced and, with less handling required, there would be considerable reduction in breakage, bruising, and subsequent spoilage. Cost reductions in this area are based on the experience of dealers who have recently moved to improved facilities and also on research results. Estimated cost reductions from this source (table 22) would amount to about $183,290.

Table 20.--Handling costs in present facilities in 1958 and in proposed wholesale food center, Knoxville

Commodity group	Carlots incurring cost 1/	Cost per carlot 2/		Total cost		Cost reduction
		Existing	Proposed	Existing	Proposed	
	Number	Dollars	Dollars	Dollars	Dollars	Dollars
Fruits and vegetables	6,213	35.48	21.00	220,437	130,473	89,964
Poultry and eggs	1,397	48.33	28.00	67,517	39,116	28,401
Meat and meat products	4,589	63.36	37.00	290,759	169,793	120,966
Dry groceries and frozen foods	2,651	67.50	29.00	178,942	76,879	102,063
Food chain organizations	9,132	61.13	30.00	558,265	273,960	284,305
Total or average	23,982	54.87	28.78	1,315,920	690,221	625,699

1/ Includes 1,254 carlots second handled (interdealer).
2/ Carlot equivalents of commodities vary in weight.

Table 21.--Costs of interdealer movement in present facilities in 1958 and in proposed wholesale food center, Knoxville

Commodity group	Carlots incurring cost	Cost per carlot		Total cost		Cost reduction
		Existing	Proposed	Existing	Proposed	
	Number	Dollars	Dollars	Dollars	Dollars	Dollars
Fruits and vegetables	272	24.82	18.00	6,751	4,896	1,855
Poultry and eggs	18	26.61	18.00	479	324	155
Meat and meat products	304	36.92	20.00	11,224	6,080	5,144
Dry groceries and frozen foods	39	34.05	22.00	1,328	858	470
Food chain organization	621	31.49	22.00	19,555	13,662	5,893
Total or average	1,254	31.37	20.59	39,337	25,820	13,517

Table 22.--Costs of spoilage, deterioration, breakage, and shrinkage in present facilities in 1958 and in proposed wholesale food center, Knoxville

Commodity group	Carlots incurring cost	Cost per carlot		Total cost		Cost reduction
		Existing	Proposed	Existing	Proposed	
	Number	Dollars	Dollars	Dollars	Dollars	Dollars
Fruits and vegetables	5,941	48.24	34.00	286,603	201,994	84,609
Poultry and eggs	1,379	25.60	21.00	35,302	28,959	6,343
Meat and meat products	4,285	33.70	28.00	144,405	119,980	24,425
Dry groceries and frozen foods	2,612	20.45	14.00	53,415	36,568	16,847
Food chain organizations	8,511	25.00	19.00	212,775	161,709	51,066
Total or average	22,728	32.23	24.16	732,500	549,210	183,290

Rents

Rental charges would be increased in the proposed food center. However, this increase would be more than compensated for through the reduction of other costs made possible by improved facilities. Rents would be higher, largely because the new food center would contain features, facilities, and services not now enjoyed by Knoxville food handlers; increased rents are the price which must be paid for reduced costs, improved working conditions, and an improved competitive position.

Comparison of rents presently charged with rents in the new wholesale food center indicates that rents would have to increase $414,329, or about 89 percent over rent presently charged (table 23).

Summary of Measurable Cost Reductions

The total measurable cost reductions made possible by moving to a new wholesale food center would amount to $840,845 per year (see table 24). This amount represents the total gross savings possible before increased rents are paid. Even after increased rents are deducted all commodity groups, except poultry and eggs, would have cost reductions over and above that necessary to pay for new facilities.

Nonmeasurable Benefits and Cost Reductions

In addition to measurable benefits, there are numerous benefits which are not readily measurable. Nonmeasurable benefits would not only accrue to wholesale food dealers but also to others interested in the food center.

Benefits to Dealers

Wholesale dealers would benefit through savings in time for salesmen, an increased volume of business, and, in general, better working conditions and improved prestige made possible by facilities in a new wholesale food center. In fact, many of the defects of the present facilities, as earlier enumerated and which could be corrected in a wholesale food center, are nonmeasurable. While such items as lack of rail spurs would be partially reflected in unnecessary cartage costs, additional nonmeasurable costs could be encountered through the inconvenience of having to pull a crew from another job to get packages from a railcar, and also the possibility of losing a sale. Even defects such as lack of adequate toilet facilities or insufficient employee parking, while unmeasurable, could certainly be reflected in employee morale and, thereby, work efficiency.

Table 23.--Rentals in present facilities in 1958 and in proposed wholesale food center, Knoxville

Commodity group 1/	Space used		Rent		Increase over present rent
	Present	Proposed	Present	Proposed	
	Square feet	Square feet	Dollars	Dollars	Dollars
Fruits and vegetables 2/	162,285	120,150	75,180	192,365	117,185
Poultry and eggs	59,018	58,750	39,480	84,253	44,773
Meat and meat products	212,867	247,250	223,510	352,761	129,251
Dry groceries and frozen foods	204,210	169,700	126,610	249,730	123,120
Total	638,380	595,850	464,780	879,109	414,329

1/ Food chain organizations not included because rental data would disclose confidential information.

2/ Includes rent to be paid by carlot receivers and commodity specialists, and small wholesale stores. Other fruit and vegetable facilities not included because of noncomparable data.

Table 24.--Summary of annual cost reductions (excluding rentals) for proposed wholesale food center in Knoxville

Commodity group	Cartage	Handling	Inter-dealer movement	Spoilage, deterioration, breakage and shrinkage	Total reductions
	Dollars	Dollars	Dollars	Dollars	Dollars
Fruits and vegetables	10,616	89,964	1,855	84,609	187,044
Poultry and eggs	0	28,401	155	6,343	34,899
Meat and meat products	0	120,966	5,144	24,425	150,535
Dry groceries and frozen foods	7,723	102,063	470	16,847	127,103
Food chain organizations	0	284,305	5,893	51,066	341,264
Total	18,339	625,699	13,517	183,290	840,845

Benefits to Other Groups

Buyers using the proposed wholesale food center could expect to profit in many ways. Since it would no longer be necessary to visit the various market areas, buyers should be better informed regarding prices and supplies. The master market plan provides for wide streets with adequate parking and good loading facilities, which would reduce the time necessary for this phase of marketing, and thus reduce costs.

Farmers could anticipate savings and benefits which are not immediately self-evident. The new facilities could be expected to attract new buyers and act as a stimulant to local production. With the facilities recommended, growers could sell directly from their trucks, and could expect to spend less time selling their products.

At the present time, railroads serving Knoxville are in an unfortunate position in regard to handling many food commodities because many dealers are not served by direct rail spurs. When shippers compare the cost involved in shipping by truck with that by rail (with the additional cost of cartage when by rail) their decisions are usually in favor of shipment by truck. In order to alleviate this situation all facilities in the new food center are provided with rail spurs which will enable direct unloading at the dealers' stores, thereby eliminating most cartage costs.

In the new planned facilities truckers would benefit especially by the reduction in time required for loading and unloading. Areas have been provided where itinerant truckers may sell their commodities. These truckers would also be in a good position to acquire a return load of locally produced farm commodities. It is believed that by centralizing this traffic, sales of local producers might be materially increased. The master plan has been laid out to provide freedom of ingress and egress to truckers and adequate parking facilities to encourage this type of business.

The general working conditions for persons employed in the present Knoxville food handling facilities could be improved. At the present time, the hours are long; in some cases a full 7 days are necessary. These conditions could be regulated by common consent in a new wholesale food marketing center. The new buildings have been designed for efficient handling, especially with the use of proper handling equipment. This could increase workers' productivity to such an extent that it could result in higher wages. Besides improving general working conditions and environment, the new food center provides a restaurant and adequate parking for workers' cars.

Among the greatest beneficiaries of a new market and of improved conditions would be the ultimate consumers. They would receive their perishable food in better condition at a more reasonable price, especially if the savings accruing from a new market center were shared by all. It is possible that with improved quality available at lower prices, the consumer would increase the purchases of recommended dietary foods.

There are many other ways by which the Knoxville area could benefit from the construction of a new wholesale food center. These new facilities would probably be built in a new area and this possibly could result in higher tax revenue than is obtained from the present facilities. The move from present to new facilities would facilitate the enforcing of health, sanitation, and fire regulations, as well as assist in crime prevention. All market traffic would be located in one market area, and streets would not be blocked by market vehicles, as often occurs now. Since all of the citizens of the Knoxville area are consumers, the city would be doing them a service by encouraging improved facilities for the handling of their food in a wholesale area. It is almost a certainty that good and adequate facilities would increase the volume of business in the market and would also bring additional business to the area.

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